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U.S. Department of Agriculture
1965 BUDGET
EXPLANATORY NOTES

FOREST SERVICE

PREFACE

Project statements -

The obligations shown in the project statements are on the basis of the appropriations and activities proposed in the 1965 Budget Estimates. In some project statements, the activities are further divided into sub-categories, reflecting a more detailed description of the work conducted under the appropriation items.

Obligations reflected as subcategories in the project statements, while generally obtained from accounting records, in some instances represent the best approximation available. Wherever it has been necessary to distribute costs to activities for which total amounts cannot be taken directly from the accounts, every effort has been made to allocate such charges as accurately as possible based on other available information such as past experience, special studies, cost analyses, etc.

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FOREST SERVICE

Purpose Statement

The Forest Service is responsible for promoting the conservation and wise use of the country's forest and related watershed lands, which comprise one-third of the total land area of the United States. To meet its responsibility the Forest Service engages in three main lines of work, as follows:

1. Management, protection, and development of the National Forests and National Grasslands. The 186 million acres of National Forests and National Grasslands are managed under multiple use and for sustained yield. Under these principles natural resources of outdoor recreation, range, timber, watershed, and wildlife are utilized in a planned combination that will best meet the needs of the Nation without impairing the productivity of the land. These management and utilization principles were recognized in the Multiple Use-Sustained Yield Act of June 12, 1960 (Public Law 86-517, 74 Stat. 215).

In managing the National Forests, technical forestry is applied to the growing and harvesting of timber crops. Grazing use is managed to obtain proper range conservation along with utilization of the annual growth of forage. Watersheds are managed to regulate stream flow, prevent floods, and provide water for power, irrigation, navigation, and municipalities. Management includes the handling of 125 million visits of people to the National Forests for recreation purposes. Wildlife habitat is managed to provide a suitable land and water environment for both game and non-game wildlife.

Under the multiple use principles most areas are used for, or serve, more than one purpose or objective. For example, about 50 percent of the area within the National Forests serves five different purposes: (1) timber production, (2) watershed protection, (3) forage production, (4) wildlife production, and (5) recreation. An additional 28 percent serves four purposes in varying combinations. Of the remainder, 21 percent of the total serves three purposes with only one percent of the total reserved exclusively for a single purpose, mainly campgrounds and special use areas, such as summer homesites, pastures, corrals, etc. The varied interests which frequently conflict and which must be reconciled, and the vast areas covered, clearly require careful planning and skillful management of the National Forest properties.

Gross area within unit boundaries encompasses about 226 million acres in 44 States and Puerto Rico, of which some 186 million acres are under Forest Service administration. Protection from fire and trespass is made difficult by the large area to be protected, the general inaccessibility, the many thousands of miles of exterior boundary, the intermingled public and private land, the impossibility of taking preventive action with such a problem as lightning-caused fires, and the rapidly increasing public utilization of these lands and their associated resources.

The protection of the National Forests includes the control of forest fires, the control of tree disease and insect epidemics, and the prevention of trespass.

The major development activities of the National Forests are reforestation; timber stand improvement; revegetation; construction of roads, recreational facilities, range and other necessary improvements; and land acquisition and exchanges.

The economic importance of the National Forests and National Grasslands is evident when it is considered that:

a. They produced a cash income in the fiscal year 1963 of over \$126 million. The following table summarizes cash receipts, showing actual for fiscal years 1962 and 1963, and estimated for fiscal years 1964 and 1965:

<u>Class of receipts</u>	<u>1962 Actual</u>	<u>1963 Actual</u>	<u>1964 Estimated</u>	<u>1965 Estimated</u>
Timber sales	\$106,158,478	\$117,387,497	\$121,000,000	\$123,200,000
Grazing	3,196,128	3,385,978	3,500,000	3,600,000
Land uses	3,306,433	3,738,160	4,000,000	4,300,000
National grasslands	<u>1,512,929</u>	<u>1,712,565</u>	<u>1,750,000</u>	<u>1,800,000</u>
Total receipts ..	114,173,968	126,224,200	130,250,000	132,900,000

Above amounts include:

Suspense account,
Alaska a/

(633,861) (820,828) (900,000) (900,000)

Suspense account,
O&C Lands b/ ... (3,548,809) (4,341,916) (4,000,000) (4,000,000)

Approximately 65% of this amount is credited to the general fund in the Federal Treasury (miscellaneous receipts). The remainder is distributed in accordance with special acts of Congress, including 25% to the States or counties in which lands are located, and 10% made available for construction and maintenance of the Forest Service system of roads and trails. In addition to these cash receipts, there are the even greater economic values which result from the processing of end products derived from this utilization of National Forest timber, forage, minerals, etc. There are also the important values of water, recreation, and wildlife which cannot be readily expressed in monetary terms.

a/ Account established pending settlement of Indian rights on Tongass National Forest, Alaska.

b/ Account established for Oregon and California railroad grant lands, for which receipts are transferred to Department of the Interior for distribution under the Acts of August 28, 1937, June 24, 1954, and August 3, 1961 (43 U.S.C. 1181f-g).

b. The area within National Forest boundaries is equivalent to some 10% of the area of the continental United States. Over 40% of this land is within areas now experiencing severe economic distress. Proper management, development, and utilization of these lands are important factors in permanent improvement of these local economies. Millions of people who live in and near the National Forests are supported in whole or in part through the economic development arising from the forests and their resources.

c. The National Forests supplied 10 billion board feet of timber in fiscal year 1963 to the Nation's forest products industries. This is expected to increase to 11 billion board feet in 1964. Dependence of the forest products industries on National Forest timber continues to increase as the result of depletion of good quality timber on private lands.

d. About 6 million head of domestic livestock (including calves and lambs) are grazed on the National Forests and Grasslands.

e. These lands provide protection to municipal water supplies for nearly all western cities and towns and many in the East, to irrigation water used on about 20 million acres of western lands, and to many streams with water power developments. They provide flood protection to thousands of acres of rich valley lands and help to prevent more rapid siltation of reservoirs and stream channels.

f. They provide a habitat for a large part of the big game animal population, for birds, for millions of small game animals and furbearers, and for fish.

g. They provide opportunities for healthful outdoor recreation, with a minimum of restrictions, for millions of people who yearly visit the National Forests.

2. Forestry research. The Forest Service conducts research in the entire field of forestry and the management of forest and related ranges. This includes the growth and harvesting of timber, its protection from fire, insects, and diseases, the protection and management of watersheds, and improved methods for development and management of recreation resources. It conducts studies in forest economics, marketing of forest products, and a survey of the present extent and potential growth and use of the Nation's forest resources. It also conducts research to develop new and improved products from wood, to increase efficiency of utilizing forest products, and to advance the efficiency and mechanization of forestry operations. Results of research are made available to owners of private forest and range lands, to public agencies which administer such lands, to forest products industries, and to consumers. The program has a two-fold objective: (1) to backstop the National Forest development program by devising more efficient practices for protecting, managing, and utilizing forest resources; and (2) to develop new and improved practices that will lead to sounder uses of forests in other public and private ownerships and more efficient and profitable utilization and marketing of forest products.

The Forest Service also cooperates with the Agricultural Research Service of the Department by reviewing and appraising for technical adequacy forest research projects beneficial to the United States which are conducted abroad. These projects are carried out with foreign currencies under Section 104(k) of Public Law 480, as amended, and the dollar expenses of the Forest Service in connection with this work are paid from the appropriation "Forest Protection and Utilization."

3. Cooperation with State and private forest landowners. The Forest Service cooperates with State agencies and private forest owners to (a) better protect the 440 million acres of State and privately owned forests and critical watersheds against fire, insects, and diseases; (b) encourage better forest practices, both for resource conservation and profit, on the 358 million acres of private forest land; (c) aid in the distribution of planting stock for forests, shelterbelts, and wood lots; (d) stimulate development and proper management of State, county and community forests.

The Forest Service is also responsible for carrying out the provisions of Section 401 of the Agricultural Act of 1956 (16 U.S.C. 568e), by providing assistance to the State Forester or equivalent State official, through advice, technical assistance, and financial contributions for increased tree planting and reforestation work, in accordance with plans submitted by the State and approved by the Secretary of Agriculture.

Proper administration, protection, and development of these forest resources is essential as they must be so managed as to yield the maximum resource potential. In many rural areas, the forestry resource is the key to the establishment and maintenance of sound local economies. The State and private forestry programs of the Forest Service are a vital part of the Department of Agriculture's overall rural area development program.

Other work related to forestry includes:

4. Insect and disease control. Activities to suppress and control destructive insects and diseases that threaten timber areas include two types of work carried on jointly by Federal, State, and private agencies: (a) Surveys on forest lands to detect and evaluate infestations of forest insects and infections of tree diseases and determination of protective measures to be taken, and (b) control operations to suppress or eradicate forest insects and diseases, including white pine blister rust.
5. Flood prevention and watershed protection. On National Forest lands and on non-Federal forest lands within the watersheds authorized for treatment by the Department of Agriculture under the Flood Control Act of December 22, 1944, the Forest Service plans and installs watershed improvement measures, in the form of minor physical structures, cultural measures, and intensified fire control, to retard runoff and reduce flood water and sediment damage. Work on non-Federal land is carried on in cooperation with the Soil Conservation Service and the appropriate State and local agencies.

The Forest Service also cooperates with the Soil Conservation Service, appropriate State agencies and the local organizations sponsoring small watershed protection and flood prevention projects initiated under the Watershed Protection and Flood Prevention Act of 1954, as amended, in planning and installing forestry and related measures on the watersheds and in interagency studies of proposed water and land resource developments on river basins for the purpose of obtaining integrated resource development programs.

6. Work performed for others. The Forest Service is frequently called upon to perform services for other Federal, State, or private agencies on a reimbursable or advance payment basis. Examples of these activities are:

- a. Protection of other Federal and non-Federal forest lands intermingled with the National Forests.
- b. Disposal of slash resulting from sales of timber and the rehabilitation of such areas.
- c. Construction and maintenance of roads, and other improvements.
- d. Research investigations in forest, range, and water management and utilization problems.
- e. Cooperative survey, mapping, administrative, and reforestation projects, etc.
- f. Cooperation with defense and mobilization agencies on forest production and utilization projects, and related work.

7. Rural fire defense. The Forest Service, as a part of its regular programs, also directs Federal activities and provides technical guidance and training to States concerned with the prevention and control of fires which might be caused by an enemy attack in rural areas of the United States.

The Forest Service maintains its central office in Washington, with program activities decentralized to 10 Regional Offices, 129 Forest Supervisors' offices, 801 District Rangers' offices, 10 Forest and Range Experiment Stations, the Institute of Tropical Forestry, and the Forest Products Laboratory.

Summary of Estimated Appropriations and Receipts, 1964 and 1965

Item	:	1964	:	Budget Estimates	:	Increase (+) or Decrease (-)
<u>Appropriations</u>						
Forest protection and utilization:						
Forest land management	a/	\$146,834,000		\$150,419,000		+\$3,585,000
Forest research		25,853,000		29,944,000		+\$4,091,000
State and private forestry cooperation		15,917,000		16,955,000		+\$1,038,000
Total, Forest protection and utilization	b/	188,604,000		197,318,000		+\$8,714,000
Forest roads and trails	a/	63,200,000		72,300,000		+\$9,100,000
Acquisition of lands for National Forests, Special Acts		70,000		70,000		---
Acquisition of lands for Wasatch National Forest		250,000		150,000		-\$100,000
Cooperative range improvements		700,000		700,000		---
Assistance to States for tree planting ..	a/	1,000,000		1,000,000		---
Expenses, brush disposal (permanent)		9,000,000		9,200,000		+\$200,000
Roads and trails for States (permanent) ..		12,000,882		12,400,000		+\$399,118
Forest fire prevention (permanent)	a/	45,000		25,000		-\$20,000
Restoration of forest lands and improvements (permanent)	a/	100,000		100,000		---
Payment to Minnesota (permanent)		130,986		133,000		+\$2,014
Payments to counties, National Grasslands (permanent)		437,500		450,000		+\$12,500
Payments to school funds, Arizona and New Mexico (permanent)		100,413		110,000		+\$9,587
Payments to States, National Forests fund (permanent)		29,993,959		31,100,000		+\$1,106,041
Total		305,632,740		325,056,000		+\$19,423,260
Deduct permanent appropriations (shown in detail above)		51,808,740		53,518,000		-\$1,709,260
Total (excluding permanent appropriations)		253,824,000		271,538,000		+\$17,714,000
<u>Receipts</u>						
Forest resource utilization		130,250,000		132,900,000		+\$2,650,000

a/ In addition, prior year balances are available.

b/ Exclusive of \$123,000 transferred to General Services Administration and \$421,000 transferred to the Office of the Inspector General, Department of Agriculture.



(a) Forest Protection and Utilization

	<u>Forest Land Management</u>	<u>Forest Research</u>	<u>State and Private Forestry Cooperation</u>	<u>Total</u>
Appropriation Act, 1964	<u>a</u> /\$147,312,000	\$25,893,000	\$15,943,000	<u>a</u> /\$189,148,000
Transferred to				
"Operating Expenses, Pub- lic Buildings Service, General Service, General Services Administration" for space rental	-123,000			-123,000
Activities transferred in the 1965 estimates to:				
"Salaries and ex- penses, Office of the Inspector General".....	-346,000	-39,000	-25,000	-410,000
"Salaries and ex- penses, Office of Management Services"	-9,000	-1,000	-1,000	-11,000
Base for 1965	<u>a</u> /146,834,000	25,853,000	15,917,000	<u>a</u> /188,604,000
Budget Estimate, 1965	<u>a</u> /150,419,000	29,944,000	16,955,000	<u>a</u> /197,318,000
Increase	<u>+3,585,000</u>	<u>+4,091,000</u>	<u>+1,038,000</u>	<u>+8,714,000</u>

a/ In addition, \$700 thousand is available by transfer from
"Cooperative Range Improvements."

SUMMARY OF INCREASES AND DECREASES, 1965

Forest Land Management:

For reforestation and stand improvement to accelerate the rate of reforestation and timber stand improvement measures	+1,200,000
For recreation-public use to provide for operation and maintenance of recreation areas and facilities	+800,000
For maintenance of structural improvements for fire and general purposes	+123,000
For additional payments to Employee's Compensation Fund	+95,000
Reduction in acquisition of lands (Weeks Act) due to special land purchase included in fiscal year 1964	-462,000

Forest Research:

Reduction in timber management research due to savings resulting from consolidation of program activities	-47,000
For watershed management research to strengthen the technical basis for management of watersheds and adjacent water-producing mountain lands	+36,000

For forest insect research to intensify search for pest control methods that will reduce hazards associated with chemical control	+200,000
For forest disease research to strengthen research on serious diseases damaging young natural stands, plantations, and natural hardwood forests	+41,000
For forest engineering research to develop new systems for harvesting and transporting timber	+75,000
For forest survey to accelerate and strengthen survey activities	+150,000
For forest research construction to construct facilities at Madison, Wisconsin for research on forest products utilization	+3,165,000

State and Private Forestry Cooperation:

For cooperation in forest fire control to strengthen fire protection	+250,000
For cooperation in forest management and processing to provide technical assistance to additional small private forest owners and sawmill operators	+500,000
For general forestry assistance to provide specialized technical forestry assistance	+250,000
For additional pay act costs in 1965 on the second step of the pay increases required by Public Law 87-793	+2,338,000
Total increase, Forest protection and utilization	<u>+8,714,000</u>

PROJECT STATEMENT

Project	1963	1964 (estimated)	Increases or Decreases			1965 (estimated)
			Increased :	Pay Costs :	Other	
			(PL 87-793):			
FOREST LAND						
MANAGEMENT:						
National Forest						
protection and						
management:						
(1) Timber re-						
source manage-						
ment:						
(a) Sales ad-						
ministration						
and management	\$25,005,530	\$28,788,000	+\$526,000		- -	\$29,314,000
(b) Reforesta-						
tion and stand						
improvement ..	14,522,276	15,645,000	+164,000	+\$1,200,000	17,009,000	
(2) Recreation-						
public use	26,765,824	24,951,000	+259,000	+800,000	26,010,000	
(3) Wildlife hab-:						
itat management	2,895,573	3,571,000	+53,000	- -	3,624,000	
(4) Range re-						
source manage-						
ment:						
(a) Management	4,959,113	5,008,000	+100,000	- -	5,108,000	
(b) Revegetation:	2,470,952	2,714,000	+23,000	- -	2,737,000	
(c) Improvements:	2,999,247	3,252,000	+28,000	- -	3,280,000	
(5) Soil and						
water management:	5,277,374	5,275,000	+70,000	- -	5,345,000	
(6) Mineral						
claims leases,						
and special uses:	3,270,546	3,731,000	+63,000	- -	3,794,000	
(7) Land classi-						
fication, ad-						
justments, and						
surveys	4,018,110	3,829,000	+70,000	- -	3,899,000	
(8) Forest fire						
protection	20,204,964	22,738,000	+273,000	- -	23,011,000	
(9) Structural						
improvements for:						
fire and general:						
purposes (con-:						
struction and						
maintenance) ..	13,527,398	10,814,000	+84,000	+123,000	11,021,000	
(10) Payments to						
Employees'						
Compensation						
Fund	28,728	520,000	- -	+95,000	615,000	
Subtotal	125,945,635	130,836,000	+1,713,000	+2,218,000	134,767,000	

(Continued on next page)

Project	1963	1964 (estimated)	Increases or Decreases			1965 (estimated)
			Increased	Pay Costs	Other	
			(PL 87-793)			
Deduct amount advanced from "Cooperative Range Improvements"	-700,000	-700,000	- -	- -	- -	-700,000
Subtotal, National Forest protection and management ...	125,245,635	130,136,000	+1,713,000	+2,218,000	+134,067,000	
(11) Fighting forest fires ..	18,606,605	5,000,000	- -	- -	- -	5,000,000
(12) Insect and disease control:						
(a) white pine blister rust control	3,484,363	b/3,551,000	+36,000	- -	b/3,587,000	
(b) Other pest control	a/9,870,193	c/7,185,000	+80,000	- -	c/7,265,000	
Subtotal, Insect and disease control	13,354,556	10,736,000	+116,000	- -	- -	10,852,000
(13) Acquisition of lands (Weeks Act)	499,099	962,000	- -	- 462,000	-	500,000
Subtotal	157,705,895	146,834,000	+1,829,000	+1,756,000	+150,419,000	
Deduct amount advanced from "Cooperative Work, Forest Service" for fighting forest fires ..	1,400,000	- -	- -	- -	- -	- -
Total, Forest Land Management	156,305,895	146,834,000	+1,829,000	+1,756,000	+150,419,000	
FOREST RESEARCH:						
Forest and range management research:						
(14) Timber management research:	5,958,375	6,552,000	+114,000	-47,000	-	6,619,000
(15) Watershed management research	2,286,957	2,631,000	+46,000	+36,000	-	2,713,000
(16) Range management research:	1,018,948	1,140,000	+21,000	- -	-	1,161,000
(17) Wildlife habitat research ..	527,267	584,000	+11,000	- -	-	595,000

(Continued on next page)

Project	1963	1964 (estimated)	Increase or Decrease			1965 (estimated)
			Increased Pay Costs	Other	(PL 87-793)	
(18) Forest re- creation research:	394,639	413,000	+8,000	- -		421,000
Subtotal, Forest and range man- agement research:	10,186,186	11,320,000	+200,000	-11,000		11,509,000
Forest protection research:						
(19) Forest fire research	1,376,063	1,819,000	+29,000	- -		1,848,000
(20) Forest insect research:	1,897,402	2,002,000	+39,000	+200,000		2,241,000
(21) Forest dis- ease research :	1,599,810	1,693,000	+33,000	+41,000		1,767,000
Subtotal, Forest protection research	4,873,275	5,514,000	+101,000	+241,000		5,856,000
Forest products and engineering research:						
(22) Forest prod- ucts utiliza- tion research :	4,602,232	4,961,000	+108,000	- -		5,069,000
(23) Forest engi- neering re- search	219,437	221,000	+4,000	+75,000		300,000
Subtotal, Forest products and engineering research	4,821,669	5,182,000	+112,000	+75,000		5,369,000
Forest resource economics re- search:						
(24) Forest sur- vey	1,588,543	1,673,000	+31,000	+150,000		1,854,000
(25) Forest prod- ucts marketing research	661,920	999,000	+17,000	- -		1,016,000
(26) Forest eco- nomics re- search	478,839	530,000	+10,000	- -		540,000
Subtotal, Forest resource eco- nomics research:	2,729,302	3,202,000	+58,000	+150,000		3,410,000
(27) Forest re- search con- struction	2,752,900	635,000	- -	+3,165,000		3,800,000
Total, Forest Research	25,363,332	25,853,000	+471,000	+3,620,000		29,944,000

(Continued on next page)

Project	1963	1964 (estimated)	Increase or Decrease			1965 (estimated)
			Increased	Pay Costs	Other	
			(PL 87-793):			
STATE AND PRIVATE :						
FORESTRY COOPER- :						
ATION:						
(28) Cooperation :						
in forest fire :						
control	12,464,892:	12,494,000:	+14,000:	+250,000:	12,758,000	
(29) Cooperation :						
in forest tree :						
planting	299,136:	300,000:	---	---	---	300,000
(30) Cooperation :						
in forest manage- :						
ment and proc- :						
essing	2,501,915:	2,513,000:	+5,000:	+500,000:	3,018,000	
(31) General for- :						
estry assistance:	560,907:	610,000:	+19,000:	+250,000:	879,000	
Total, State and :						
Private Forestry:						
Cooperation ...	15,826,850:	15,917,000:	+38,000:	+1,000,000:	16,955,000	
Total, Forest :						
Protection and :d/						
Utilization ...	197,496,077:	188,604,000:	+2,338,000:	+6,376,000:	197,318,000	
Unobligated bal- :						
ance lapsing ..	520,145:	---	---	---	---	---
(32) Total in- :						
creased pay :						
costs on second :						
step of pay in- :						
crease (PL 87- :						
793)	(- -):	(2,139,000):	(+2,338,000:	(+49,000):	(4,526,000)	
Total available :						
or estimate ...	198,016,222:	188,604,000:	+2,338,000:	+6,376,000:	197,318,000	
Transferred to :						
"Operating :						
expenses, Public:						
Buildings Serv- :						
ice, General :						
Services Admin- :						
istration"	+275,478:	+123,000:				
Transferred to :						
"Operating ex- :						
penses, general :						
administration, :						
Agriculture" ..	+7,300:	---	---			
Comparative trans-:						
fer to other :						
accounts	+376,000:	+421,000:				
Total appropria- :						
tion or estimate:	198,675,000:	189,148,000:				

(Continued on next page)

- a/ Includes \$3,000,000 provided by Supplemental Appropriation, PL 88-25, approved May 17, 1963. \$1,284,336 of this amount was obligated in fiscal year 1963; \$1,715,664 will be obligated in fiscal year 1964.
- b/ Includes allocation to the Department of the Interior: 1964, \$344,520; 1965, \$344,000.
- c/ Includes allocation to the Department of the Interior: 1964, \$1,102,171; 1965, \$900,000.
- d/ Represents obligations as follows:

Obligated F.Y. 1963 (excluding \$376,000 comparative transfer)	\$196,156,413
Estimated obligations, F.Y. 1964, per <u>a/</u> above	1,715,664
Applied costs for F.Y. 1963 are	198,721,479

The difference of \$849,402 reflects, primarily, contractual services and equipment received in 1963 over contracts made and orders placed in that year.

JUSTIFICATIONS OF 1965 ESTIMATES

The net increase of \$8,714,000 in the Forest Protection and Utilization appropriation consists of:

1. Increased Pay Costs, PL 87-793	\$2,338,000
2. Program increases and decreases	6,376,000
Total net increase	8,714,000

The Explanatory Notes have been reorganized to bring together in one place all of the justifications for each project. Examples of recent progress formerly presented in a separate section are now included along with the explanation of program proposed for the budget year. Pay Act costs are explained as a separate item at the end of the justification statements and the individual explanation of project increases or decreases is limited to the actual program change.



(1) Timber resource management

(a) Sales administration and management \$29,314,000

No program increase is proposed for fiscal year 1965.

An estimated 11.2 billion board feet of National Forest timber will be cut, an increase of 200 million board feet over the estimated 11.0 billion being cut during fiscal year 1964. Approximately 12.0 billion board feet are to be offered for sale.

In many sections of the Nation the timber-based industries are becoming increasingly dependent on National Forest timber as a major source of supply. This is evidenced by the fact that although total annual domestic production of industrial roundwood has remained fairly constant over the past 10 years, the annual cut of industrial roundwood products from the National Forests has nearly doubled, and continues to increase as other sources of timber supply dwindle. The increasing dependency of timber-based industries on National Forest sawtimber is even more striking. In 1952 the sawtimber cut from these lands amounted to an estimated 12% of the total domestic production; by 1962 this figure had risen to nearly 28% of the total production even though National Forest land capable of producing continuous crops of industrial wood comprises less than 18% of the total estimated commercial forest land in the Nation.

The Forest Service goal is to meet these increasing needs by offering timber for sale at full allowable cut rates insofar as practicable. The orderly cutting of National Forest timber in accordance with sound forest management principles and in harmony with other forest resources and uses not only improves conditions for future timber growth, but keeps mills going, provides employment, and contributes substantially to the general economy. The program proposed for 1965 is:

Sale preparation 12.0 billion bd. ft. at \$0.65 per M	....	\$7,800,000
Sale administration 11.2 billion bd. ft. at \$1.66 per M	....	18,600,000
Advance sale preparation 3 billion bd. ft. at \$0.30 per M	....	900,000
Timber inventories and management plans	.....	1,488,000
Subtotal	.....	28,788,000
Pay Act costs	.....	526,000
Total	.....	\$29,314,000

Examples of Recent Accomplishments

Sales administration. A record volume of 10.0 billion board feet of timber and timber products was harvested in fiscal year 1963. This is 0.6 billion board feet more than the previous high of 9.4 billion board feet cut in 1960 and 1.0 billion board feet more than was harvested in 1962. Receipts amounted to \$117.4 million, compared to \$106.2 million in 1962 and the high of \$140.1 million in 1960. A total of 12.2 billion board feet of timber was sold during 1963, up 1.9 billion board feet from the preceding year. Volume sold amounted to 97% of the allowable cut. (See Figure A-1.)

A major accomplishment during the latter part of fiscal year 1963 was the sale of over 1.3 billion board feet of storm-damaged timber on the National Forests of Oregon and Washington. This was nearly 65% of the

total National Forest timber damaged. The remaining 0.7 billion board feet will be sold during fiscal year 1964. More than 0.4 billion board feet of this storm-damaged timber was actually salvaged in 1963. The entire salvage operation has been correlated among the various timber owners and managers--private, State, and other Federal agencies. (See Figure A-2.)

Timber sales activities have an influence on all other resource uses. Thus, the increasingly heavy multiple use demands developing on the National Forests have a significant impact on the timber sale program. Complex prescriptions must be developed and applied in harvesting timber so that impact on other resource values is minimized or eliminated. Waterfront zones as shown in Figure A-3 present many difficult and time-consuming problems that the timber manager must solve as a prerequisite to making timber available for harvest.

Market conditions have continued to show improvement as evidenced by the volume of timber sold and harvested. The following table shows progress made during the past five years in meeting the sustained-yield allowable cut objectives: (Volumes in Billions of Board Feet)

Fiscal Year	Annual Allowable Cut 1/	Actual Cut	Percent of Allowable Cut Harvested	Actual Sold	Percent of Allowable Cut Sold
1959	10.2	8.3	81	9.4	92
1960	10.4	9.4	90	12.2	117
1961	11.0	8.4	76	8.9	81
1962	11.2	9.0	81	10.3	92
1963	12.6	10.0	79	12.2	97
1964 (Est.)	13.2	11.0	(83)	12.0	(91)

1/ As of January 1 preceding the fiscal year.

Timber inventories and management plans are designed to organize each major management unit (working circle) into an array of timber stand ages and conditions which will insure continuous and relatively uniform annual production of commercially valuable timber without damage to soil and water-flow and in harmony with the other forest resources and uses. Because of changing inventories and economic and forest area conditions the timber management plan for each working circle is revised at approximately decade intervals. In fiscal year 1963, revised plans were approved for 47 (13%) of the 350 working circles. These revisions covered 19,275,000 acres (20%) of the 94,459,500 acres of unreserved commercial forest land within working circles. The commercial area was reduced 425,500 acres (0.45%) due to land reclassifications and wilderness reservations. This progress includes the accumulation of results of preparatory work done in past years in an effort to erase a long-standing backlog of improved planning needs. The allowable annual cut was raised 623.1 million board feet to 11.1 billion board feet of sawtimber-size trees plus 424.1 million cubic feet in trees below sawtimber size or grade. Part of the sawtimber increase resulted from interim adjustments of allowable cutting rates which were made in response to industry requests in areas of critical stumpage needs.

Substantial progress was made in: (1) coordination of National Forest management plan inventories with the forest survey; (2) standardization of inventory procedures; and (3) development of area condition classifications more useful for long-range planning.

TIMBER RESOURCE MANAGEMENT

COMPARISON OF ANNUAL ALLOWABLE CUT AND ACTUAL VOLUME HARVESTED 1955 - 1965

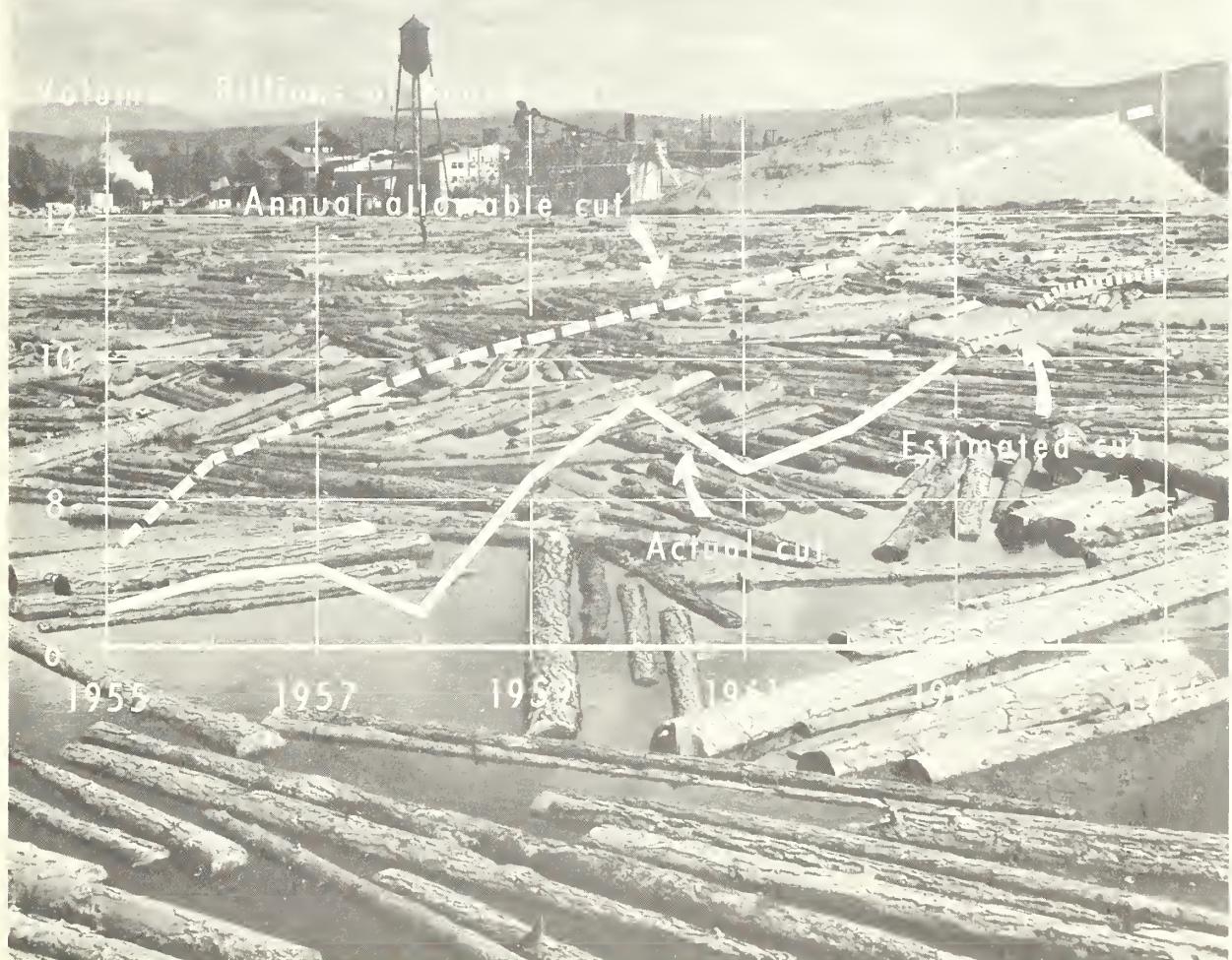
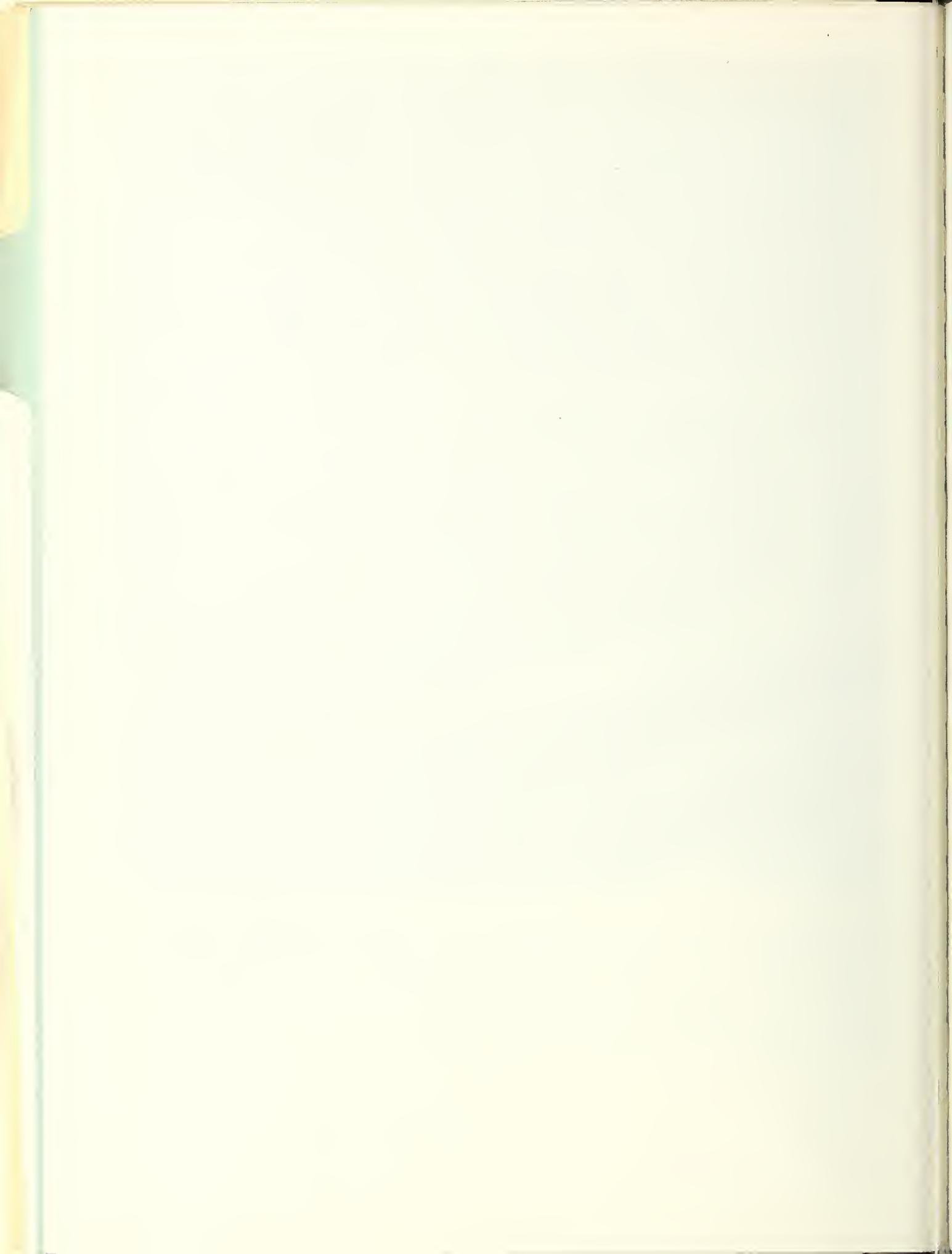


Figure A-1



On October 12, 1962, a severe storm swept into Oregon, Washington, and northern California inflicting heavy resource and improvement damage. Prompt salvage of blown down timber was imperative to alleviate the twin threats of insect invasion and fire, and to salvage the timber before it deteriorated with a loss in related values. This picture shows an example of the nature of the timber damage. Such jackstrawed timber is difficult and costly salvage, particularly since time is of the essence.

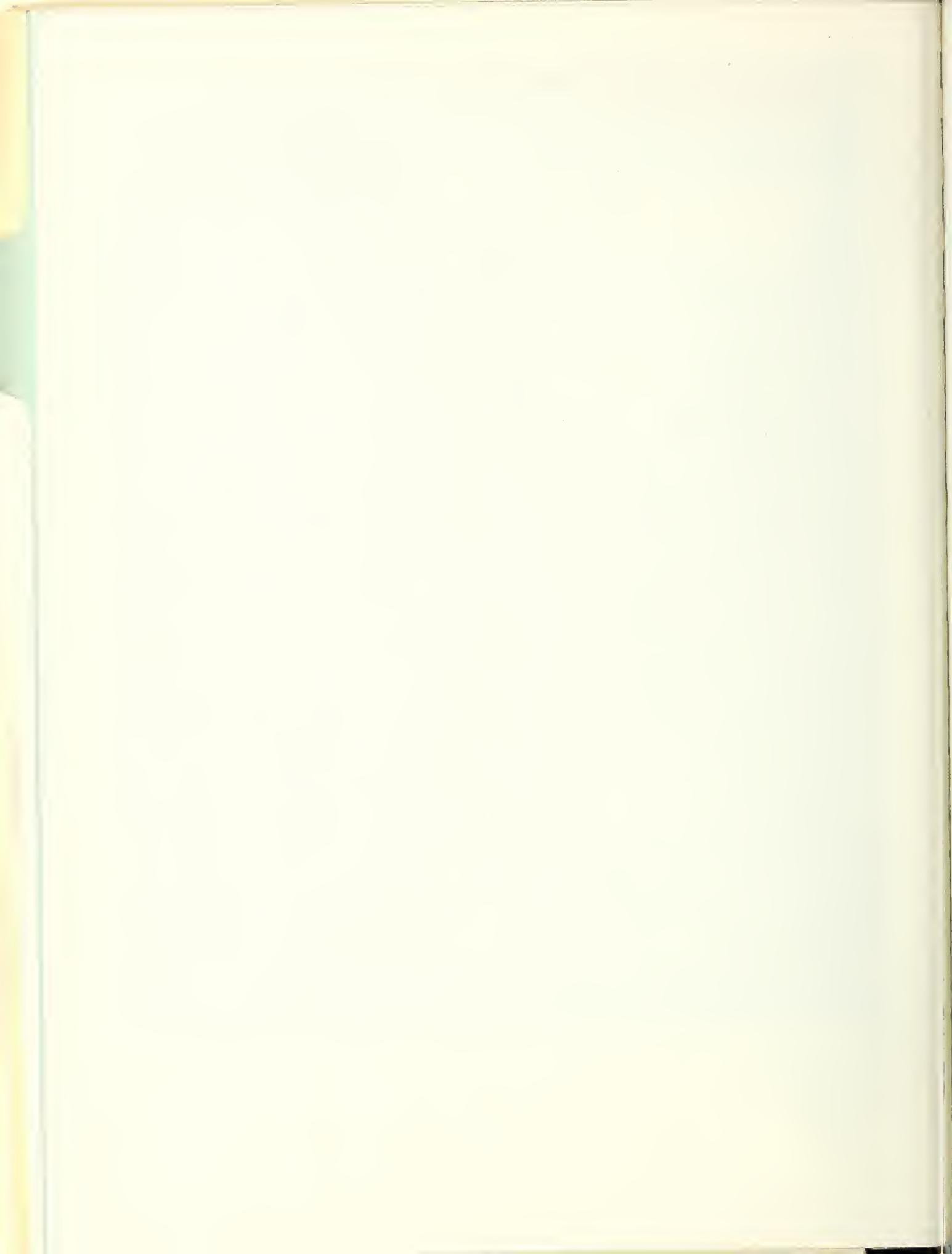
Figure A-2





Provision must be made in developing timber sales in areas such as this to adequately protect the recreation and water resource values, yet providing the timber user an economically sound opportunity to harvest timber.

Figure A-3



(b) Reforestation and stand improvement \$17,009,000

An increase of \$1,200,000 in reforestation and stand improvement would be used to accelerate the rate of reforestation by 40,000 acres and timber stand improvement measures by 10,000 acres. These increases would provide for program accomplishments of less than 36% of the planned acreage objectives established for 1965 under the Development Program for the National Forests. Even with the additional accomplishments made possible with Accelerated Public Works funds in 1963 and 1964 and the proposed 1965 increase, less than 10% of the 10-year needs will have been met during these three years.

If the National Forests are to make their full contribution to the country's projected annual requirements for industrial wood by the year 2000, reforestation of nonstocked and poorly stocked areas and cultural improvement of young overdense or suppressed timber stands must proceed at a much faster pace than has been possible thus far. As of fiscal year 1963 there were approximately 4.4 million acres of commercial forest land on the National Forests in need of reforestation, of which an estimated 3.8 million acres should be planted by 1972. There were also an estimated 10 million acres of existing young timber stand urgently in need of thinning, release and weeding, and other cultural measures to improve their productive condition. The level of commercial timber harvesting on the National Forests and the development and maintenance of a thrifty growing forest are directly dependent on the timely execution of the reforestation and stand improvement program.

Summary of total program proposed for fiscal year 1965:

Reforest 160,000 acres of nonproductive commercial forest land, including cost of trees and tree seed production	.....	\$10,700,000
Develop and improve nurseries at 10 locations and 130 tree seed orchards and seed production areas 1/	.....	1,245,000
Release and weed, thin, or otherwise improve conditions for future timber growth on 245,000 acres of young timber stands	.....	4,900,000
Subtotal	.....	16,845,000
Increased pay costs	.....	164,000
Total	.....	17,009,000

1/ Nursery development costs include \$72,000 for the purchase of 80 acres of land to complete the development of the Humboldt Nursery in California.

Examples of Recent Accomplishments

Reforestation. Using both regular and APW funds, approximately 114,000 acres of National Forest land were reforested by planting and seeding in fiscal year 1963, and an estimated 128,000 acres will be completed in 1964. This rate of progress falls short of meeting planned progress toward the objective of reforesting 3.8 million acres of nonproductive

Project (1-b)

National Forest land by 1972. Most of this land is covered with brush or other vegetation that must be removed or controlled by mechanical site preparation to reduce competition before it can be planted or seeded. Seed is usually broadcast by helicopters; planting is done by machines, where ground conditions are suitable. (See Figure B-1.) Approximately 107,000 acres were reforested in fiscal year 1963 with funds collected under the Knutson-Vandenberg Act of June 9, 1930, on timber sale cutover areas. The total area of 221,000 acres planted and seeded on National Forest lands during fiscal year 1963 nearly equaled the previous record of 223,000 acres established in 1936.

A hundred or more seed-production areas and 28 seed orchards have been established to produce forest tree seed of better genetic quality and higher resistance to diseases than is available from natural stands. Seed-production areas are high-quality stands from which all but the very best trees are removed. They will supply seed until seed orchards of grafts from specially selected and tested trees come into seed production. (See Figure B-2.)

Rehabilitation and development of Forest Service nurseries during fiscal year 1963 increased production capacity to approximately 250 million trees annually to assure that the necessary planting stock will be available to meet the planting needs of future years.

Timber Stand Improvement. Approximately 329,000 acres were treated in fiscal year 1963. Nearly a third of this accomplishment was possible as a result of additional financing received under the Accelerated Public Works program. An estimated 335,000 acres will be treated in 1964 using regular and APW funds. While this is progress, it falls considerably short of the accomplishment rate required to meet the needs for increasing timber production by thinning and other cultural treatments on the 10 million acres of reproduction and young stands that should be treated by fiscal year 1972. (See Figures B-3 and B-4.)

During fiscal year 1963, approximately 268,000 acres of stand improvement work was completed on timber sale cutover areas with funds collected under the Knutson-Vandenberg Act of June 9, 1930. Such stand improvement work maintains high production in the young timber stands that are released or regenerated in the cutover areas.

Reforestation



Planting trees by machine on the Donner Pass burn, California. Merchantable fire-killed trees have been harvested. Unmerchantable trees and logging slash have been bunched for burning and to prepare site for planting. This planting machine was developed at the Arcadia Equipment Development Center to do the job better, more safely, and at less cost.



A 19-year old slash pine plantation on an old field in Georgia. Selected trees have already been cut for pulpwood to thin the stand and to liquidate planting costs.

NATIONAL FOREST 10-YEAR PROGRAM 3.8 MILLION ACRES

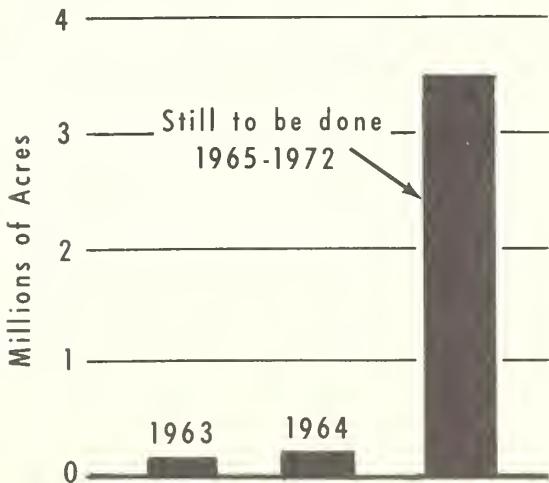
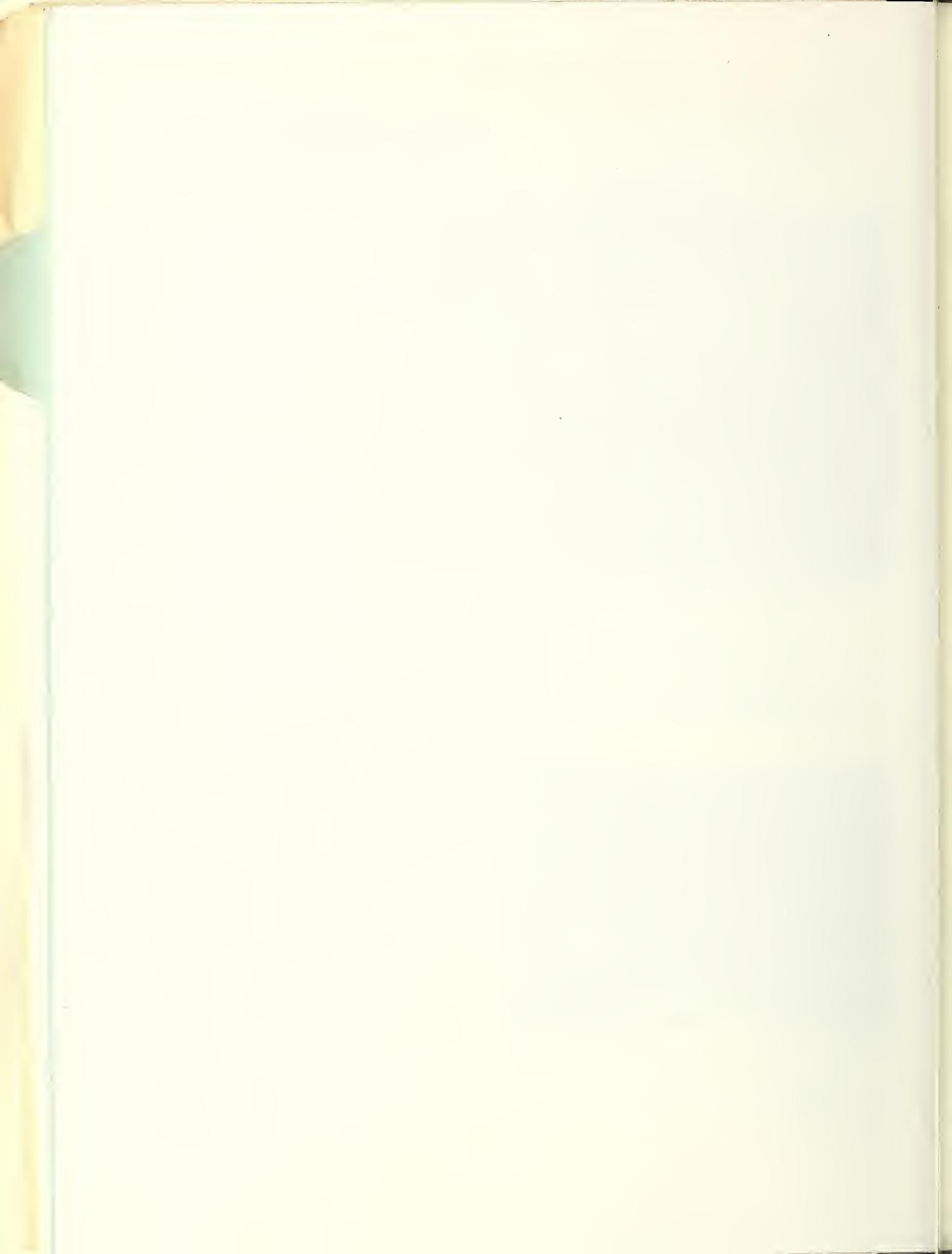


Figure B-1



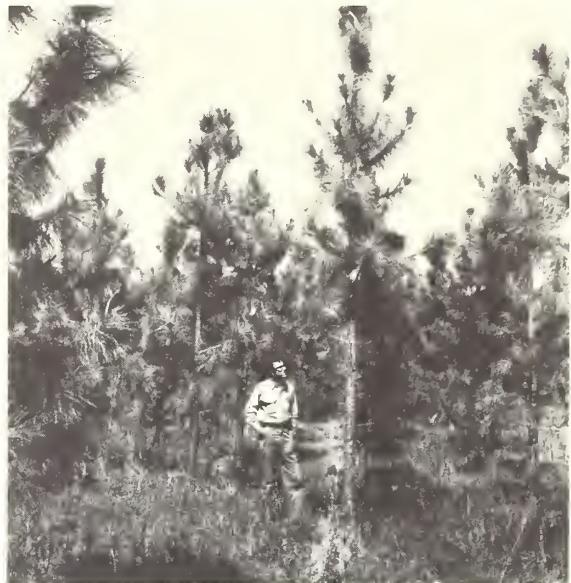
Forest Tree Improvement

Tree improvement is a vital part of the reforestation effort. Some trees are definitely superior to others in genetic qualities such as growth and form. Improving the breed is as important in trees as in cattle.

Good Parents Produce Good Progeny



This parent tree has a long straight bole and narrow crown.



Its progeny shows the same good characteristics.

Poor Parents Produce Poor Progeny



This parent tree has a crooked stem. It will produce only short, inferior lumber.



Many of its progeny will also be crooked.

Figure B-2(1)



This is one of 400 western white pines selected from more than about 100,000 trees for resistance to the blister rust disease. The tree stands out among the other trees of same species and age because it is uncankered. Other white pines all around the apparently resistant tree are dead or dying due to blister rust cankers, often as many as 100 to 500 per tree.

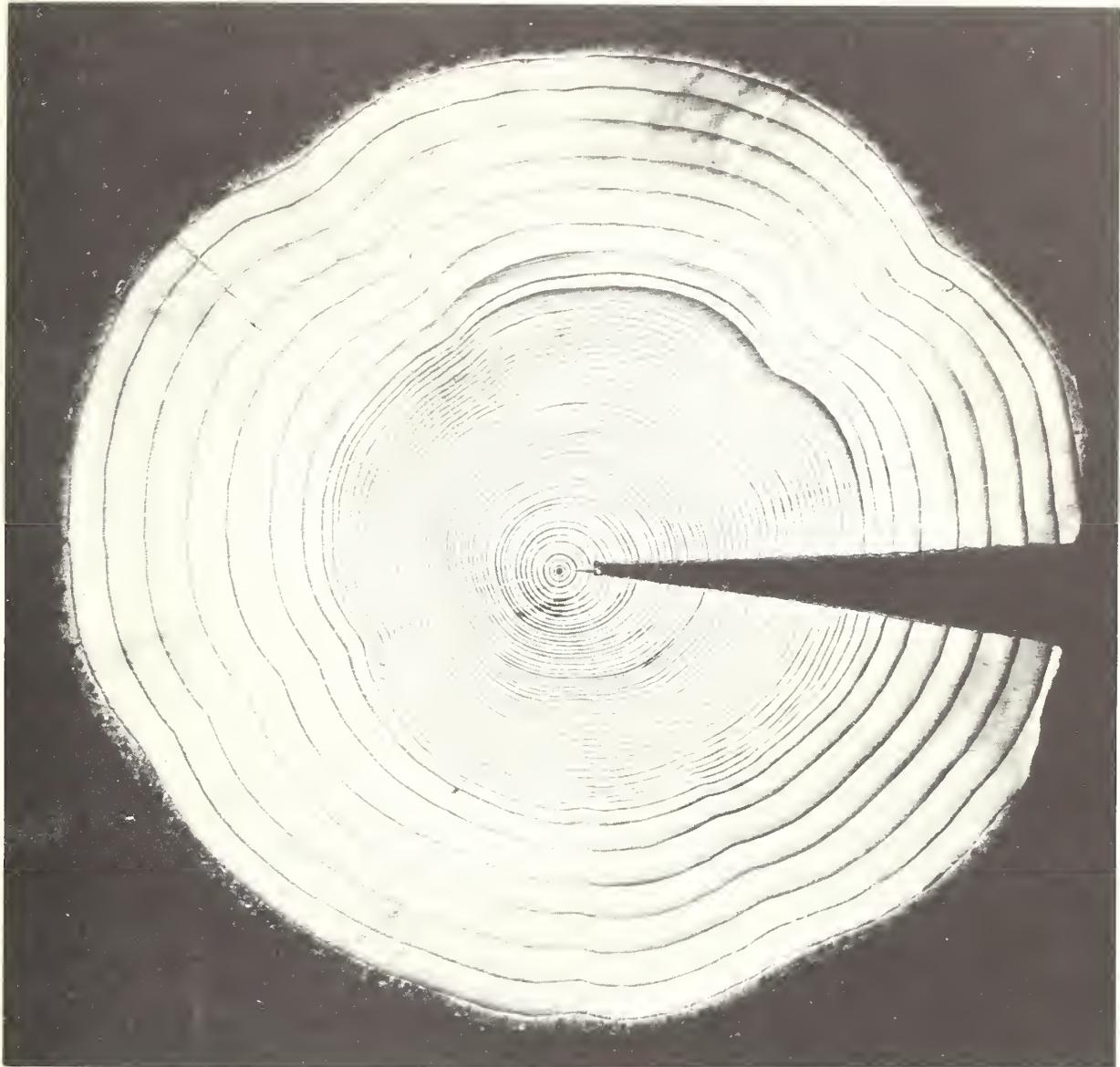
Trees of good genetic quality must be located, meticulously evaluated, ---



--- and reproduced in seed orchards such as this one where the progeny of many parents are being tested. Only those which consistently produce good progeny will be kept to produce seed.

Figure B-2 (2)

Timber Stand Improvement



The photo shows increase in growth rate after thinning. This tree put on twice as much volume in 7 years after thinning as it did in 55 years before thinning.

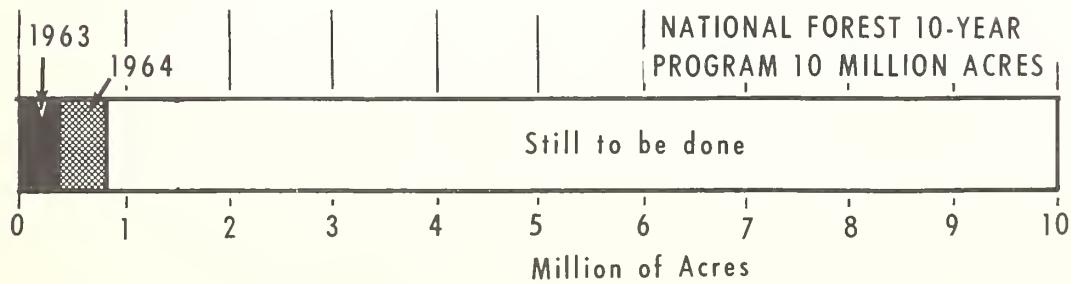


Figure B-3



Timber Stand Improvement--Thinning



Stagnated stand of young growth before thinning. Growth rate is similar to that shown in the center of illustration in Figure B-3. (Kootenai National Forest, Montana.)



Same area immediately after thinning. Release from crowding will result in increased annual growth similar to that shown for the last 7 years in Figure B-3.

Figure B-4

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(2) Recreation-public use \$26,010,000

An increase of \$800,000 for recreation-public use would be used to provide for adequate operation, sanitation, cleanup, and maintenance of recreation areas and facilities; develop new sites to alleviate some of the overcrowding and to properly meet expanding use; and to provide necessary visitor information services.

Recreation use of the National Forests continues to rise sharply. During the period 1950 through 1962, annual visits have increased from 27 million to 113 million (over 400%). Recreation use is expected to increase to 125 million visits in calendar year 1963, 140 million visits in 1964, and near 200 million visits by 1972. As of June 30, 1962, overuse of National Forest campground and picnic facilities amounted to 70% of their capacity. During fiscal years 1963 and 1964, approximately 16,450 additional family camp and picnic units are being constructed with regular and Accelerated Public Works funds. However, due to the rapid increase in recreation use, overuse at camp and picnic sites will still be 58% based on the 1963 installed capacity of 28.8 million and expected use of 45.5 million visitor days use. (See Figure C-1.) This overuse contributes to rapid deterioration of facilities, permanent damage to land and resources, and detracts from the enjoyment of the visitors. To meet this use impact, 283,000 new units, plus development of 4,000 other types of recreation facilities, must be completed during the period 1963-1972.

This increasing use of the forests, particularly during the past 5 years, has given emphasis to the need for providing visitor information services ranging from simple nature trails and scenic overlooks to visitor centers, housing exhibits and other interpretive facilities to better explain natural resource management. As the National Forest visitor load continues to grow and the expanding population makes even greater demands upon the vital timber, range, wildlife, and water resources of these public lands it becomes important for visitors to more clearly understand the benefits of forest lands and the need to protect and use them wisely.

At the 1964 recreation appropriation level it would take almost 30 years to provide the facilities that will be needed by 1972. Failure to provide these facilities on a timely basis would result in critical overuse demands on inadequate facilities, greatly increased cost for operation and maintenance, major sanitation and safety problems, and would jeopardize other forest resources by exposure to fire hazards and improper utilization.

The proposed 1965 recreation budget would provide for the following:

Operation and maintenance. Adequate sanitation, cleanup, and maintenance would be provided for all recreation areas to protect public health and safety, and to permit full enjoyment of these forest areas. The problems of sanitation, care and impact on recreation resulting from an estimated 140 million visits in calendar year 1964 cannot be delayed or postponed. This work must be done daily in many places. The load and impact is there and so is the obligation to provide safe and satisfactory conditions for public enjoyment of the National Forests. The \$800,000 increase included in this budget request is required to meet this need.

Project (2)

Rehabilitation of facilities. As of July 1, 1964, there will remain to be rehabilitated approximately 600 campground and picnic sites and other sites such as organization camps, winter sports, swimming, and boating. Work planned for 1965 includes rehabilitation and betterment of 6,000 campground family units and 119 other recreation sites.

Construction of new recreation facilities. The development of additional recreational facilities would be accelerated to accommodate the rapidly increasing public recreation impacts. The proposed financing would provide for the construction of 5,550 family camp and picnic units which will accommodate 30,000 persons at one time, and 100 swimming, boating, and other sites.

Recreation management plans. To provide for the continually increasing National Forest use, forest managers must operate under sound recreation management plans. All of the 154 National Forest recreation management plans are expected to be completed by July 1, 1964. The proposed 1965 financing would provide for the preparation of 495 recreation area plans involving important classification of lands valuable for recreation. These plans are needed in advance of development work.

Visitor information services. In addition to the operation and maintenance of present facilities, construction is planned as follows:

a. Primary visitor centers at:

Madison River Earthquake Area -- Gallatin National Forest,
Montana (\$95,000)
Cradle of American Forestry -- Pisgah National Forest,
North Carolina (\$80,000)

b. Secondary units. Small information centers and orientation buildings will be built at 8 locations. (Examples are: Elizabeth Furnace, George Washington National Forest, and Carp Lake, Grand Mesa-Uncompahgre National Forest.)

c. Guided and self-guided facilities. Trails (nature, historical, geological), auto tours, and boat tours in and near recreation complexes at 20 locations.

d. Other facilities and services. Additional vistas, overlooks, wayside exhibits, campfire circles, exhibits at headquarters, and interpretive signs will be installed at 25 areas.

Examples of Recent Accomplishments

In calendar year 1962, 20 million recreation visits were made for picnicking, 17 million for fishing, 8.8 million for hunting, 7.9 million for camping, and 5.2 million for skiing and other winter sports. The rest were for swimming, hiking, riding, or to enjoy forest environment. In all, there were 113 million visits not counting those who simply drove through and enjoyed

Project (2)

the scenery. The record indicates that the strong growth trend in this important National Forest activity will continue:

<u>Calendar year</u>	<u>Recreation visits to the National Forests</u>	<u>Percentage increase over 1952</u>
1952	33,007,000	
1956	52,556,000	59
1960	92,594,000	180
1962	112,762,000	242
1963 (Est.)	125,000,000	278

As of June 30, 1963, there were 67,739 family units at National Forest camp and picnic sites. Approximately 25,360 new family units have been added since the Operation Outdoors Program started in fiscal year 1958. Since fiscal year 1958, other types of recreational facilities, such as swimming, boating, and winter sports sites, have been rehabilitated, constructed, and expanded. Approximately 30 such facilities are to be rehabilitated and 53 additional facilities are to be constructed in fiscal year 1964. During fiscal year 1963 approximately 8,736 additional family camp and picnic units were constructed with regular and Accelerated Public Works funds (4,736 regular; 4,000 APW). An additional 7,700 units will be constructed in fiscal year 1964 (4,700 regular; 3,000 APW).

Recreation facilities in California, Oregon, and Washington were severely damaged in the October 12, 1962 storm. Approximately \$200,000 have been spent to restore damaged improvements and to clear debris from these recreation areas.

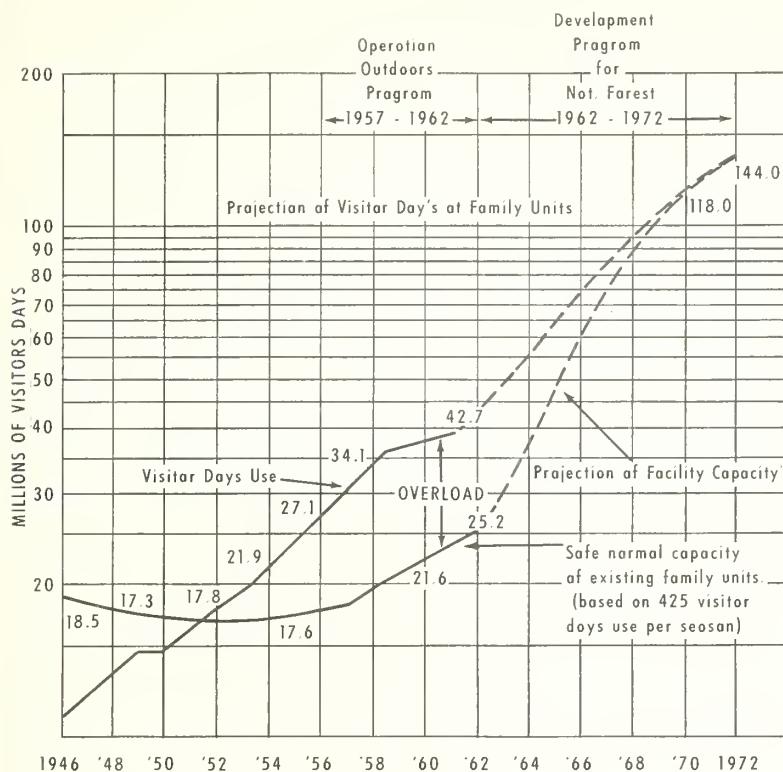
The previously completed survey of recreation resources, consisting of a field inventory and evaluation of existing and potential recreation sites, is now being used to prepare adequate recreation management plans for each National Forest as a basis for proper development and utilization of the recreation resource.

Visitor Information Service facilities have been developed to provide recreationists in the National Forests with information about visitor facilities and recreational opportunities; forest land management; history and natural history of the forests; and the work of the Forest Service. During fiscal year 1964 service and facilities are being planned and installed at additional heavy use areas to meet the growing need for this type of informational service. (See Figure C-2.)

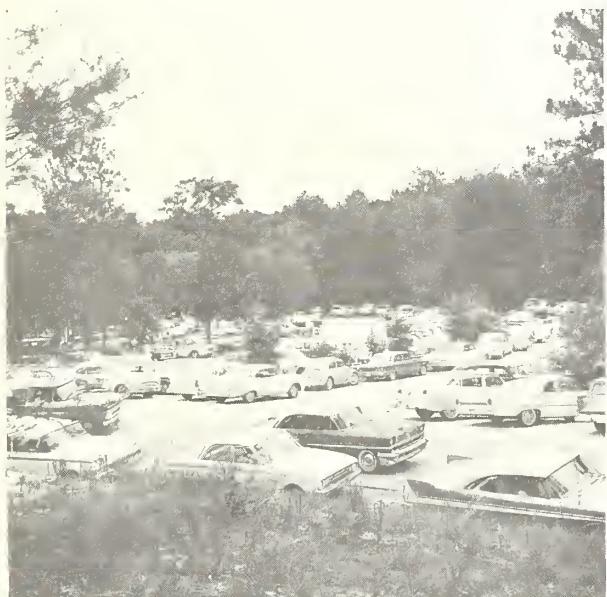
Approximately 22,600 recreation special use permits are now in effect on the lands administered by the Forest Service. These include uses such as resorts, summer homes, ski lifts, and organization sites. Fiscal year 1963 receipts from recreation use permits amounted to \$1,487,742.



Recreation - Public Use

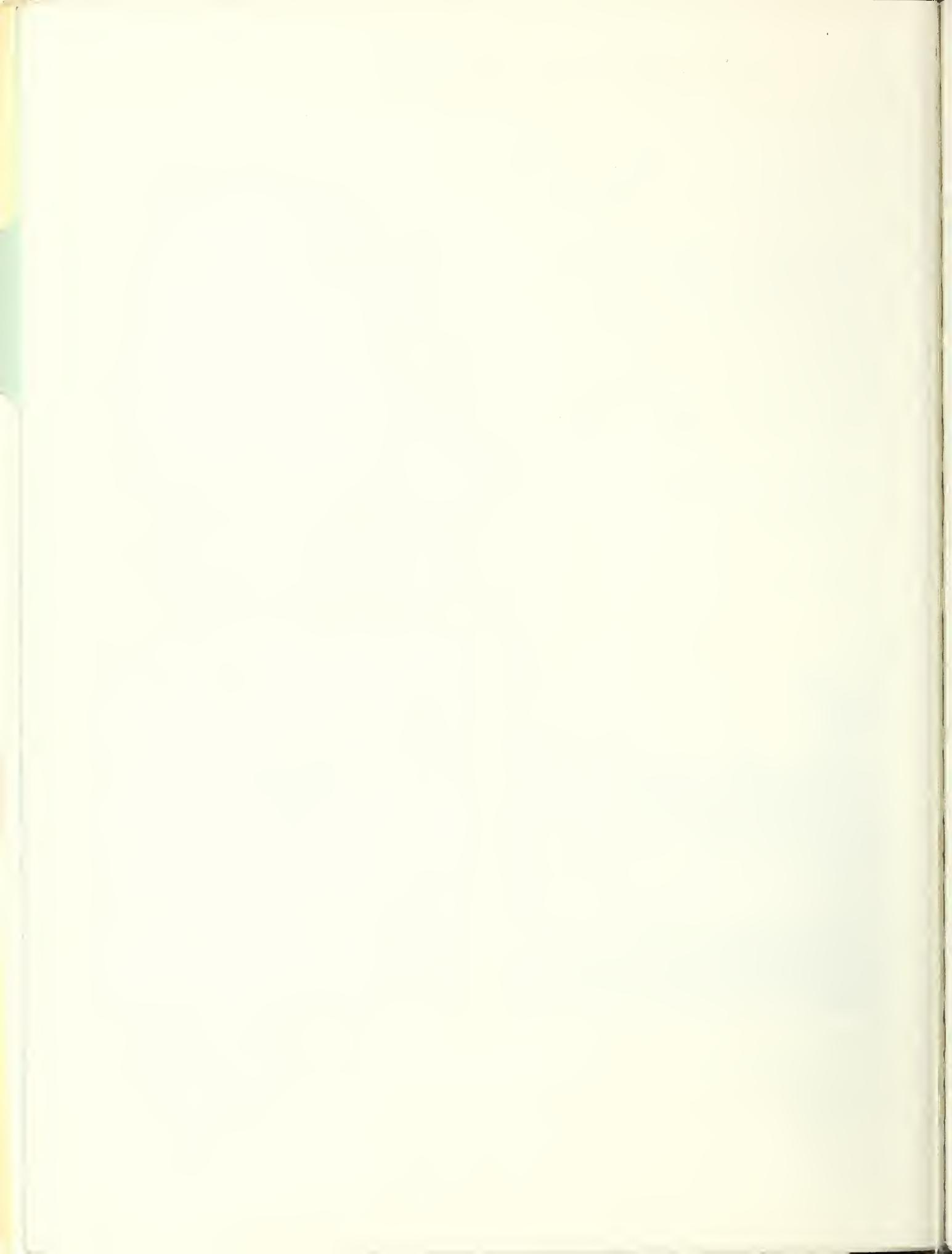


Relationship of safe capacity of family units at camp and picnic sites to actual and projected use.



Crowded conditions result in overuse of existing facilities. Public enjoyment is reduced, operation and maintenance costs are increased and overflow into undeveloped areas causes forest resource damage and public health and safety hazards.

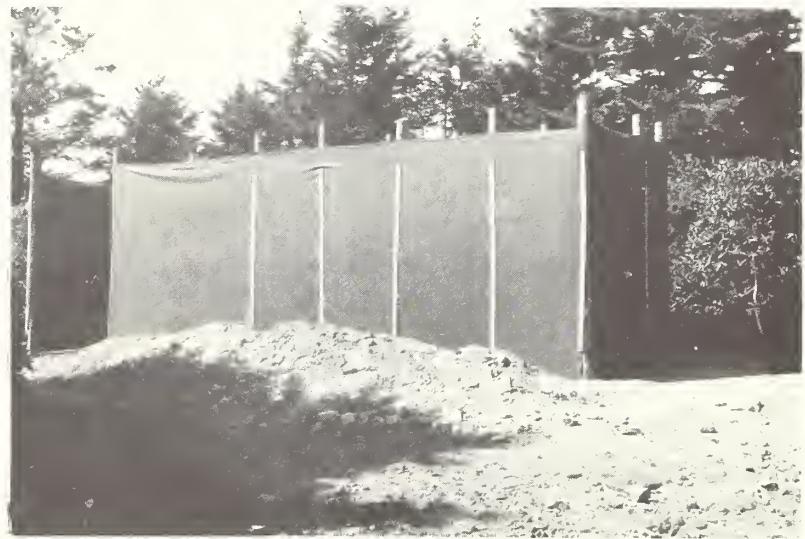
Figure C-1 (1)





Large crowds, such as on holidays, weekends, and at special events, overtax the facilities needed for average daily use---

---requiring makeshift sanitation facilities which are inadequate and undesirable.



Development of modern restroom facilities overcomes the need for temporary structures and meets sanitation requirements for normal daily use and special events.

Figure C-1 (2)





Campers, picnickers, and fishermen over-crowding presently developed sites.

Where facilities are inadequate, forest visitors overflow onto boat landings---



--- and parking areas which are inadequate to safely meet public needs.

Figure C-1 (3)



Coronado N. F.
Arizona



VISITOR CENTERS that contain an information booth, exhibit room, and an audio-visual room



SELF -
GUIDING TRAILS
that provide information about interesting wayside features

Gallatin N.F., Montana



VISITOR
INFORMATION
SERVICE
Is Accomplished Through...

SIGNS that impart significant information

PERSONAL CONTACT
at campfire programs... on conducted trips...

at manned information centers

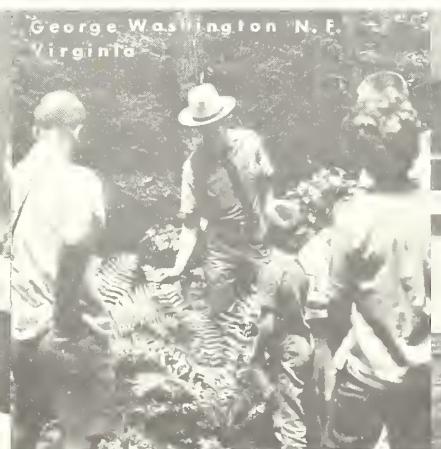


Figure C-2



(3) Wildlife habitat management \$3,624,000

No program increase is proposed for fiscal year 1965.

Approximately one-twelfth of the land area of the United States lies within the National Forests and National Grasslands. The land and its waters provide the home for wildlife and fish, both game and nongame. Within this 186 million acres are some 80,000 miles of fishing streams and 2 million acres of lakes and reservoirs. Approximately one-third of this Nation's big game animals live within these lands. Wildlife has always been an attraction to the public--both those who hunt and those who do not. It is an important part of outdoor recreation enjoyment. Visits to the National Forests for hunting and fishing have trebled in the last ten years. During calendar year 1964, it is estimated that there will be over 30 million forest visits for these purposes, and such use will increase to 50 million by 1972.

The wildlife habitat must be protected, managed, and developed so that it can support, on a multiple use basis, the wildlife populations and fish resources that will be necessary to meet this need. Productive habitat is the key to wildlife production. The National Forests can provide the essential habitat through technically directed coordination with other resource activities and by direct habitat improvement projects. Proper management and use of the wildlife resource can be of great economic benefit to forest area communities.

Under the proposed 1965 budget it is estimated that the following wildlife work would be accomplished:

Improvement of wildlife range	50,000 acres
Water developments	320 units
Fish stream improvement	260 miles
Lake improvement	2,000 acres

Examples of Recent Accomplishments

During calendar year 1962, hunters and fishermen made approximately 26 million visits to the National Forests and National Grasslands. This represents over a 300% increase in forest usage by sportsmen since 1952. (See Figure D-1.) Through more and better access facilities, hunter and fisherman use is given better distribution to help harvest fish and game surpluses. More attention is being given to the protection of endangered species of wildlife.

The Forest Service works closely and effectively with State fish and game departments to protect and improve wildlife conditions on National Forest lands. State fish and game departments are responsible for the promulgation and enforcement of game management regulations. Forest Service activities are directed toward the development of wildlife habitat necessary to supply adequate food, water, and cover on National Forest lands. (See Figure D-2.) State conservation agencies often also provide material assistance in habitat

Project (3)

improvement projects on lands administered by the Forest Service. In addition to appropriated funds available, approximately \$260,000 of State funds, including approximately \$130,000 deposited special stamp funds, were used for cooperative wildlife habitat improvement work in 1963.

Major improvement accomplishments on National Forests in fiscal years 1963 and 1964 are:

	<u>1963</u>	<u>1964 (Esti.)</u>
Improvement of wildlife range	58,000 acres	54,000 acres
Small water developments	900 units	700 units
Fish stream improvements	220 miles	280 miles
Lake improvements	2,220 acres	2,800 acres

Financing provided under Accelerated Public Works program facilitated these accomplishments.



HUNTING AND FISHING VISITS ON NATIONAL FORESTS

1952 TO 1962

(projected to 1972)

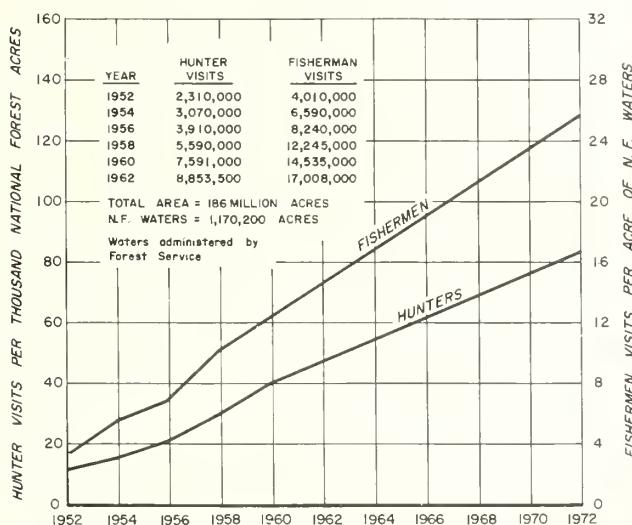


Figure D-1

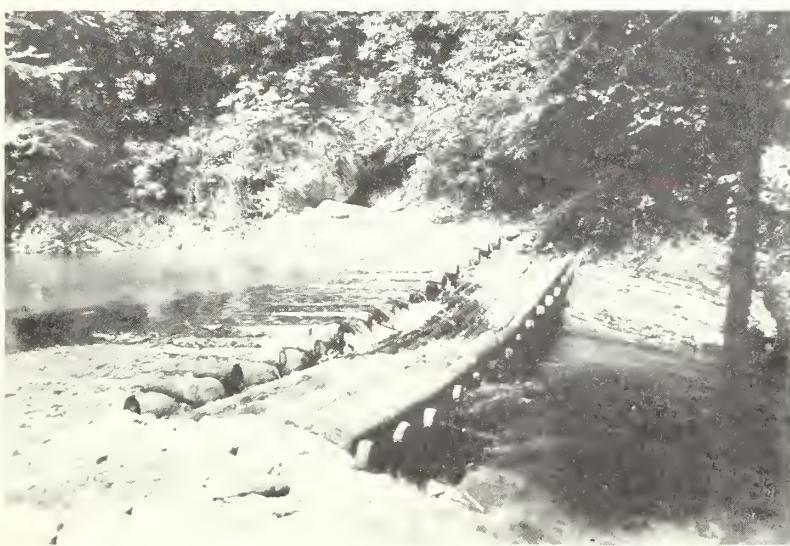




Log splash dam installed to provide cover and deep water for fish.



Anchored cover log and wing deflector provide hiding places for fish.



Rough-fish barrier installed to prevent non-game fishes from migrating upstream into the rehabilitated stream section.

Figure D-2 (1)





Opening which has been cleared and planted to wildlife forage plants.

Waterhole provides drinking water for deer and other forms of wildlife. This helps increase wildlife carrying capacity of the locality.



Elk feeding in the edge of an opening.

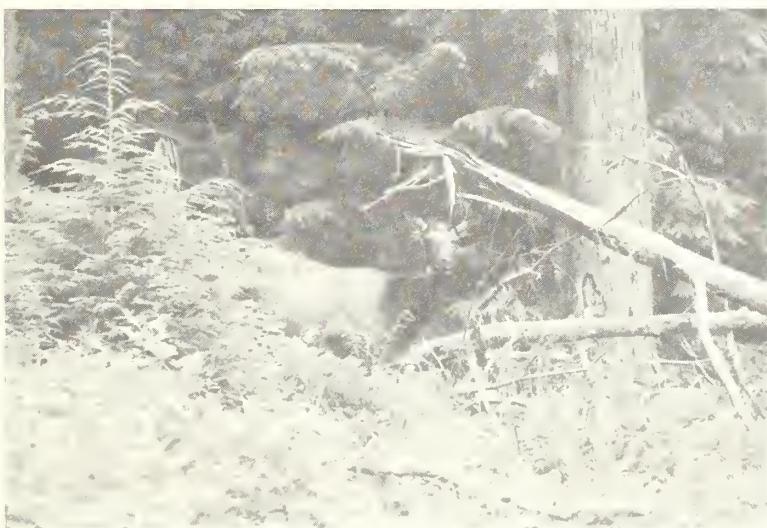


Figure D-2 (2)



(4) Range resource management(a) Management \$5,108,000No program increase is proposed for fiscal year 1965.

Grazing of livestock is one of the principal uses of the National Forests and National Grasslands. The grazing resources must be managed to provide the optimum use by livestock in coordination with other resource values and uses. To achieve this objective in addition to recurrent workload associated with administration of about 11,400 separate allotments involving over 22,000 permits, special attention must be given to the following specific needs:

1. Range allotment analysis must be completed on 4,500 range allotments as of fiscal year 1965 to provide the factual information necessary for intensive and effective management and for final determination of rehabilitation and improvement needs.
2. Development of Intensive Use Management Systems on 9,800 allotments now receiving only extensive management. This job cannot be accomplished until the needed facilities are constructed.

The 1965 budget request provides for completion of 620 units of range allotment analysis work. This accomplishment would raise the level of completion to about 65% of the initial analysis task. Periodic re-analysis and annual maintenance of management plans for a portion of the 11,400 allotments would be a part of the 1965 work.

Examples of Recent Accomplishments

During calendar year 1962, the following numbers of livestock were permitted to graze on the National Forests, National Grasslands, and Land Utilization Projects:

	Number	Animal Months
Cattle, horses, and swine	1,307,256	6,352,786
Sheep and goats	2,366,858	6,552,489

Permits are issued for adult animals only. Their offspring under six months of age are allowed to graze without additional charge. The total number of domestic animals, permitted stock plus the offspring, is about six million. In addition to the 38,306 permits covering the grazing of livestock under paid and free permits, 989 crossing permits were granted, and 2,172 permits were issued for grazing on private land waived to the Government for joint management with Government land.

Grazing receipts from lands administered by the Forest Service the past two fiscal years were:

Project (4-a)

	1962	1963
National Forests	\$3,196,128	\$3,385,978
National Grasslands and		
Land Utilization Projects	609,864	642,457
Total	\$3,805,992	\$4,028,435

Grazing fees are established annually using a formula which relates fees to the average price received for beef cattle and lambs during the previous year by livestock producers in the Western States. Average animal month grazing fees for the past two years were approximately:

	Cattle	Sheep
1962	\$0.46	\$0.0775
1963	0.49	0.09

Intensive management systems are being designed and put into effect on grazing allotments at a greatly accelerated rate.

A workload analysis was completed to determine the needs for bringing "unregulated" livestock use in the southern States under proper administrative control. Funds have been programmed to begin this work, and will be increased as the work progresses.

Work on inventory and development of management plans continued for the 11,400 grazing allotments administered by the Forest Service. During fiscal year 1963, a total of 693 allotment equivalents of work was accomplished. An additional 682 units will be completed during fiscal year 1964 which will bring the initial analysis to approximately 60% of completion. The following chart (Figure E-1) shows the present status and program goals. Training in analysis problems, standards and management procedures was continued to insure proper standardization among all Forest Service Regions for this range analysis work.



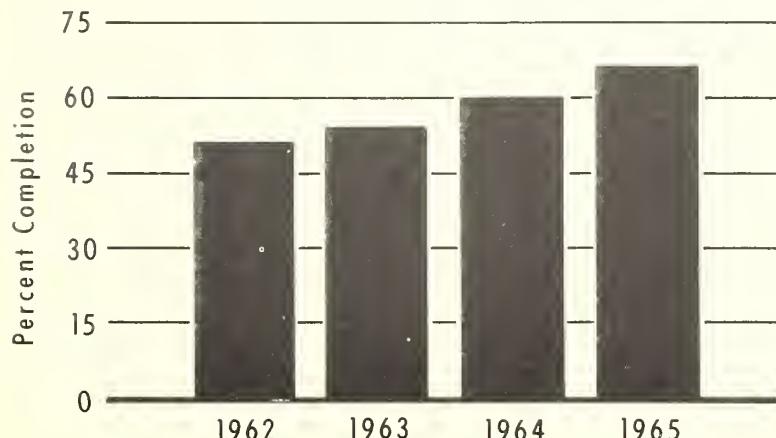
Good management of the range resource on the 11,400 grazing allotments on the National Forests---

---will come from data collected and analyzed in range allotment analysis.



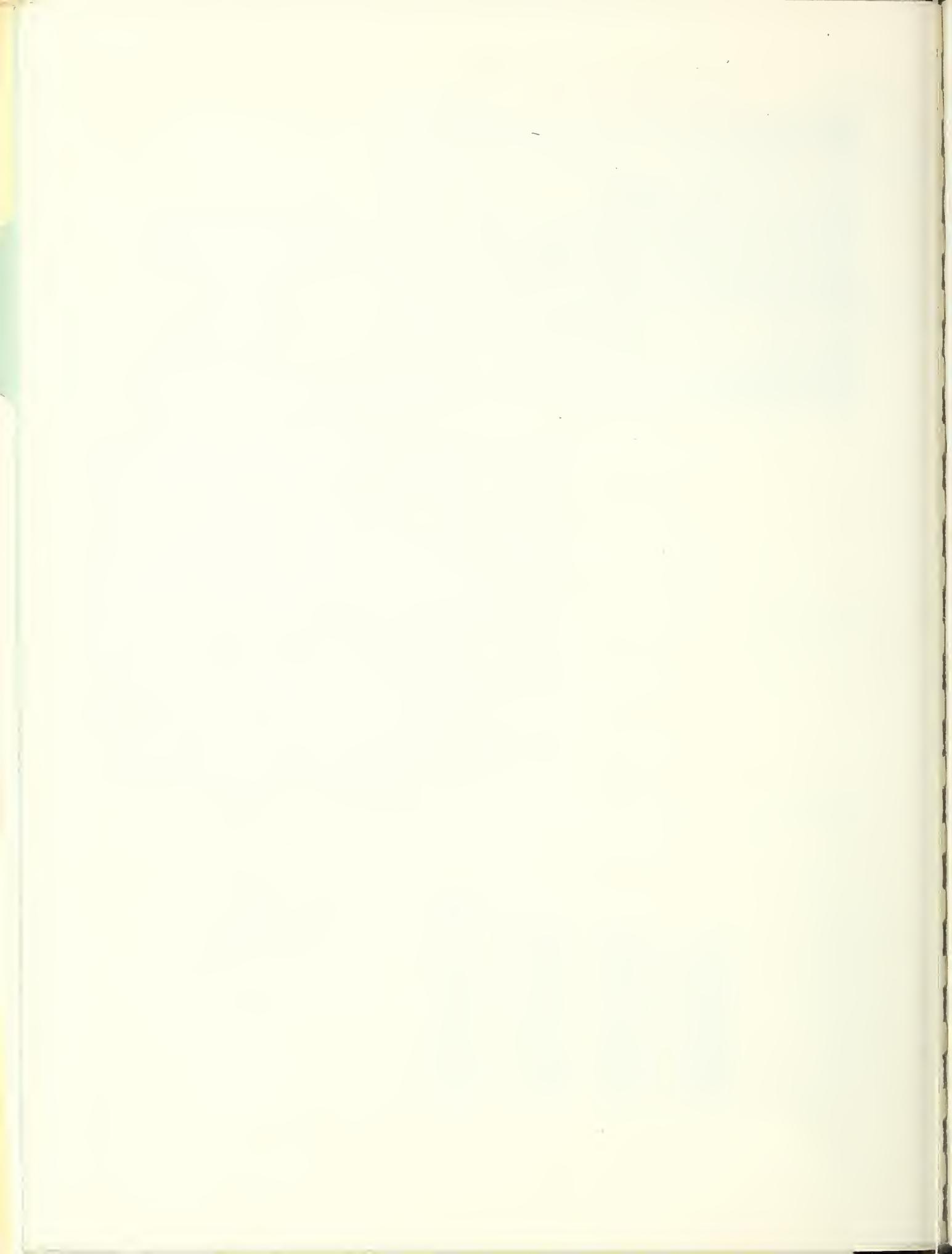
RANGE ALLOTMENT ANALYSIS AND MANAGEMENT PLANNING

The Basis for Good Range Management



Range Allotment Analysis should be complete in F.Y. 1966. However, at the current rate of accomplishment this work would be only $\frac{2}{3}$ completed by June 30, 1966.

Figure E-1



(b) Range Revegetation \$2,737,000

No program increase is proposed for fiscal year 1965.

Part of the National Forest rangelands remains in poor condition. Many of these depleted lands lie within important watersheds and, in their present condition, are a menace to urban and rural areas as they are a continuing source of flood damage and erosion loss. These lands can be restored to good forage production and watershed condition by proper rehabilitation treatment. Improving the range watershed lands will help to alleviate the need for reductions in numbers of permitted livestock or length of grazing seasons on critical allotments. Methods used to improve forage cover and stabilize soils include seeding of grasses and other forage plants, application of herbicides, grubbing with power equipment, controlled burning, water spreading, and controlling rodents and noxious farm weeds. (See Figure F-1.)

During the period 1963-1972, 4 million acres of rangeland must receive revegetation and rehabilitation treatment to restore its productivity. Failure to meet this need could have serious impact on the livestock industry dependent on these rangelands. Soil losses and damage to other forest resources will continue until these lands are properly rehabilitated. The fiscal year 1965 appropriation will provide for accomplishment of 186,000 acres.

Examples of Recent Accomplishment

During fiscal year 1963, the following range revegetation and noxious farm weed accomplishments were achieved by use of regular appropriations, Accelerated Public Works funds, cooperative deposits and other contributions by forest range users:

	<u>Total Accomplishment</u> (Acres)
Revegetation seeding	60,062
Plant control (seeded)	33,344
Plant control (not seeded)	103,829
Poison plant control	784
Noxious farm weed control	5,371
Rodent control	8,684
Water spreading	20,279

Field testing continued on various pieces of new equipment suitable for use in the range rehabilitation program to facilitate accomplishment of this work with the greatest efficiency and economy.

Project (4-c)

(c) Range Improvements \$3,280,000

No program increase is proposed for fiscal year 1965.

Range improvements are necessary to control movement of livestock in rotational management systems, provide stock water in arid areas and make possible full and sustained use of the forage resource.

An additional 16,000 miles of fence and 8,100 water developments should be built to assure full and effective use of the range resource. Failure to meet this need will result in inability to properly manage the use of these ranges. The financing proposed for fiscal year 1965 would provide for the maintenance of existing facilities and for construction of approximately 1,000 miles of range fencing, 1,300 stock watering developments and some 120 cattleguards. It is estimated that cooperating stockmen will contribute \$270,000 for cooperative maintenance and \$700,000 for new construction.

Examples of Recent Accomplishments

During fiscal year 1963, the following range improvements were constructed (Figure G-1):

	<u>Total Accomplishment</u>
Fences (miles)	2,294
Cattleguards (each)	324
Stock driveways (miles)	209
Corrals (each)	49
Water developments (each)	2,040

Approximately 20% of the funds allocated were expended for maintenance of existing range improvements. Funds provided under the Accelerated Public Works program greatly facilitated this program.

From Sagebrush To Grass

Beaverhead National
Forest - Montana



"Before spraying"
photo taken
July 14, 1959.



"After spraying"
photo taken
July 22, 1963.

Figure F-1



Range Improvements



Range fences and cattleguards are necessary for control of livestock movement and for effective forage utilization and management.

Water developments are provided to facilitate proper distribution of livestock throughout the rangelands being grazed.



Water impoundments are built to conserve spring and surface water for livestock use.

Figure G-1

(5) Soil and water management \$5,345,000

No program increase is proposed for fiscal year 1965.

The water yield from the National Forests and National Grasslands is a basic requirement of a sustained or improved economy, particularly in the rural areas of the Nation. In the eleven Western States these watersheds yield about 53% of the total runoff. This water is a direct source of supply for more than 1,000 communities and for a major segment of the agricultural, recreational and industrial water needs. National Forest lands therefore must be managed to assure a continuing and improved supply of high quality water. Soil and hydrologic surveys must be prepared to guide proper land use and water yield improvement. Since protection of the soil and water resource is basic to all other Forest uses, it is essential that this work keep pace with increased programs such as road construction, mining, timber harvest and recreational development. During the period 1963-1972 standard soil surveys are urgently needed on 29 million acres. Water yield improvement by means of vegetation management and snowpack management is being extended at the rate of 3-5 watersheds per year. This is about 1% of the National Forest watersheds in which such treatment holds promise of helping alleviate water supply deficiencies of dependent rural areas. Watershed rehabilitation is needed on 1.3 million acres and in 22,000 miles of gullies or abandoned roads. Five hundred seventy pollution and flood prevention projects should be installed. Current progress is less than 25% of the annual need. There is an increasing use of National Forest lands by other agencies for reservoirs, highways, mining and other land uses which can have a major impact on watershed and other multiple use values. Each such use requires careful study and evaluation to insure a design compatible with multiple use objectives and field supervision during construction to insure proper installation.

Major fiscal year 1965 program goals are:

- a. Complete standard soil surveys on 1.2 million acres and reconnaissance surveys on 3 million acres.
- b. Make comprehensive watershed plans for 40 representative watersheds which are the primary source of domestic, irrigation or industrial water supply or are known flood source areas.
- c. Provide technical watershed protection specifications and soil management service on 800 projects located on fragile watershed lands to prevent water pollution and to prevent accelerated erosion.
- d. Prepare multiple use surveys and provide for field coordination during construction on 250 water resource and other major construction projects of other agencies which have a major impact on National Forest multiple use programs. These surveys are required to meet the criteria and standards for formulation of water and related resource programs established by the President and published in Senate Document 97, 87th Congress.
- e. Improve hydrologic functioning, water quality, soil stability and reduce flood potential on selected watersheds which are in a seriously

Project (5)

deteriorated condition and treat an estimated 100,000 acres damaged by forest fires to reduce damage repair costs and to protect these lands from deterioration until site productivity is restored.

Examples of Recent Accomplishments

Water resource instrumentation. The Forest Service and the Soil Conservation Service are attempting to develop a remote control and recording snow gauge capable of telemetering the water content of the snowpack. This instrumentation is needed to reduce the cost of snow-course measurements.

Increasing technical proficiency. Watershed management specialists have been assigned to selected National Forests to prepare prescriptions for watershed protection to prevent damage of the water and soil resources under increased multiple use on the forests. (See Figure H-1) This includes the initiation of action for improving water yield quality and increasing the quantity of water yield, particularly late-season or low flows. Criteria, standards, and procedures to guide technical watershed management activities associated with improving the quality, quantity, and timing of water yields are nearing completion. These guides, based largely on forestry research findings, will be used as a preliminary step to hydrologic analysis and operational management of watersheds where improved water supplies are urgently needed to sustain or improve the economy of rural areas.

Soil surveys. Standard soil surveys were completed on 1.2 million acres of National Forest lands during fiscal year 1963. The current rate of progress is much less than is needed as completed surveys are basic to National Forest resource and development activities (Figure H-2). In addition to standard surveys which contribute to the National Cooperative Soil Survey, three million acres were covered by reconnaissance surveys to isolate problem areas in advance of road construction, timber harvest operations, and other planned resource programs

Multiple use (impact) surveys and coordination. During fiscal year 1963 multiple use surveys and reports were prepared for 230 projects (mostly water resource developments) planned for construction by other agencies. (See Figure H-3) These surveys serve four basic purposes:

- a. To determine how the project can best fit into National Forest multiple use objectives;
- b. To provide basic data on related land resources needed to secure maximum public benefit from the project in accordance with the "Policies, Standards, and Procedures ... for Use and Development of Water and Related Land Resources" approved by the President, May 15, 1962;
- c. To facilitate coordination between the construction agency and the Forest Service during installation of facilities to minimize interference with regular protection and management activities;
- d. To guide the modification of resource activities in keeping with contemplated change in public use requirements of the tributary areas.

Hydrologic restoration. Rehabilitation of deteriorated areas was concentrated on selected areas where site deterioration and impairment of water quality was most serious but the accomplishment rate was considerably below the need as shown in the Development Program for the National Forests. Priority attention was given to recently burned-over areas and to areas damaged by the October 1962 storm in northern California, Oregon and Washington. In the storm-damaged areas much of the work was clearing channels of debris obstruction to halt channel deterioration and to prevent subsequent surges of runoff with localized flood and sedimentation potential and to permit the normal movement of fish to and from spawning grounds. (See Figure H-4.)

About 78,000 acres of National Forest lands were burned over in fiscal year 1963. Prompt treatment was given to selected portions of this burned-over land to stabilize the soil to prevent costly damage to the watershed lands, stream channels, downstream improvements, and to avoid contamination of the water with sediment. Treatment varies with soil, climate, and topographic features of the burned area in relation to the onsite and downstream values to be protected. (See Figure H-4.)

The effectiveness of treatment is illustrated by the following storm occurrences. A 39,000-acre forest fire burned over the headwaters of the Truckee River in northern California. One burned tributary was left untreated as a check on effectiveness of rehabilitation work. A heavy storm in the area one year following the fire produced more than 2,500 cubic yards of sediment per square mile from the untreated area. In sharp contrast, the adjacent watersheds that were contour terraced and densely seeded to cereal rye grass immediately after the fire contained almost all of the erosion on the treated slopes.

The 1960 volcano fire area in the upper reaches of the American River, Tahoe National Forest, California, was contour terraced in 1960. A severe rain-storm lashed the area in late 1962 and 1963. During one 4-day period more than 18 inches of rain fell--6.65 inches in one 24-hour period. A second 5-day storm of more than 12 inches proved the continued effectiveness of the treatment program in preventing serious erosion and consequent sedimentation.

Water yield improvement. In addition to the actions described above, field testing of water yield improvement practices continued on two watersheds. Action is underway to apply the principles of water yield improvement to additional watersheds.

Municipal watersheds. The inventory of municipal watersheds was completed on National Forest lands contributing directly to community water supplies. A partial analysis of inventory data indicates that 17 million people in more than 1,100 communities depend on National Forests for all or a major portion of their water supply.



Watershed Management



The watershed specialist designs watershed protection specifications to safeguard all forest resources that may be damaged or altered by logging, road construction, or other use and development.

THIS ---

--- NOT THIS



Figure H-1

*Soil Surveys
For
Multiple Use
And
Resource
Planning*

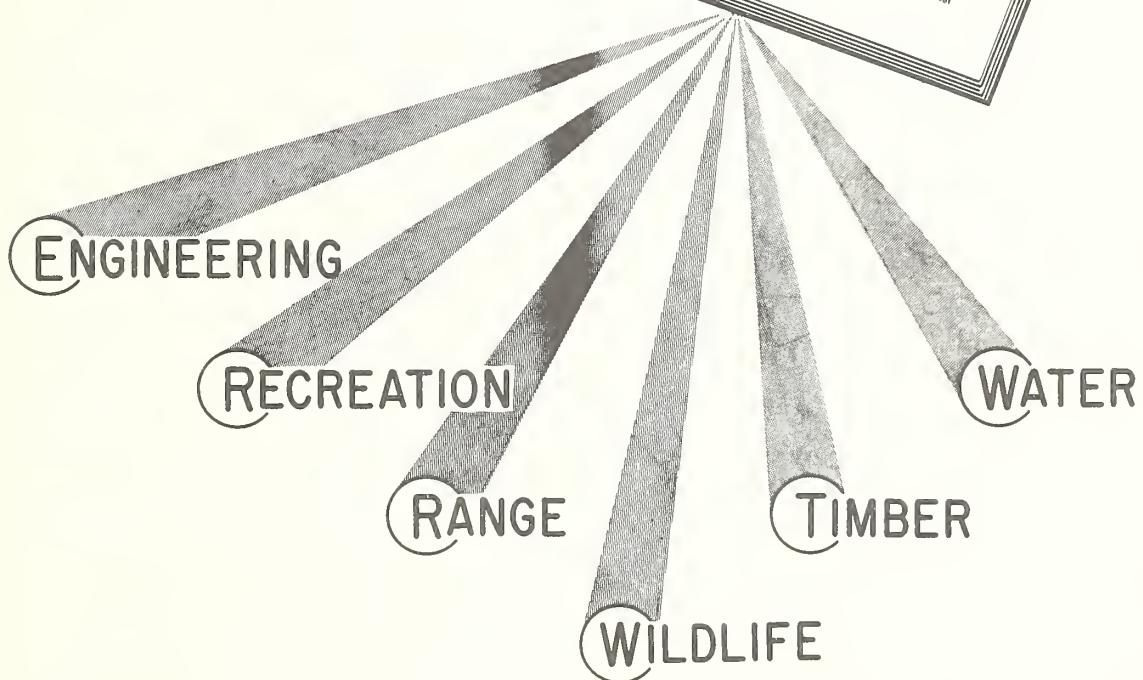
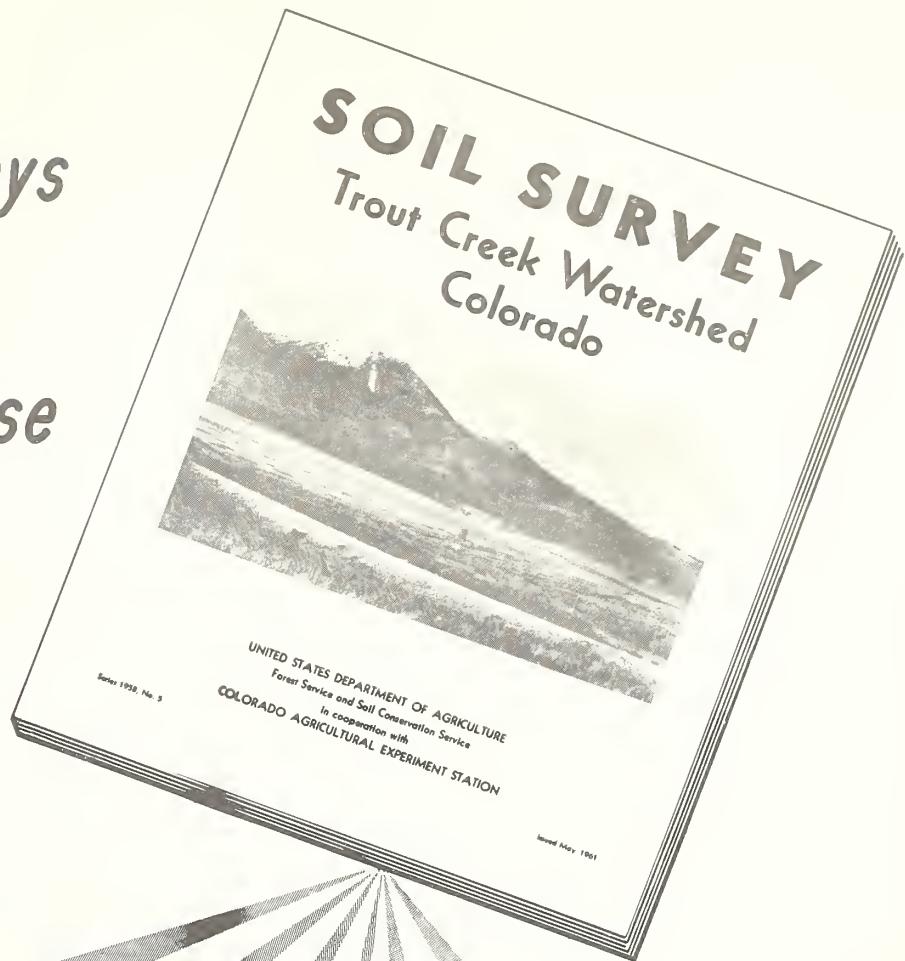
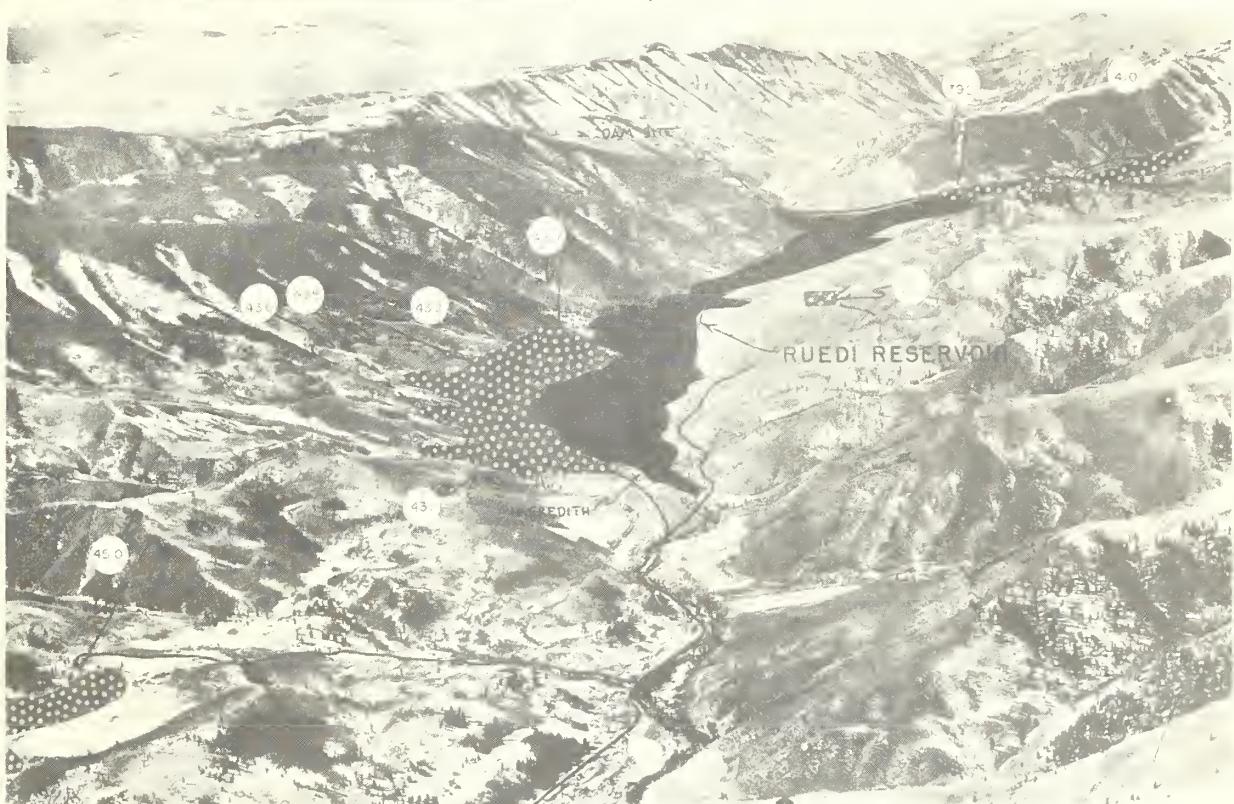


Figure H-2



Multiple use surveys fit water resources development into multiple use objectives to maximize public benefits and protect forest resources.



RUEDEI RESERVOIR

Ervington Arkansas Project - Colorado

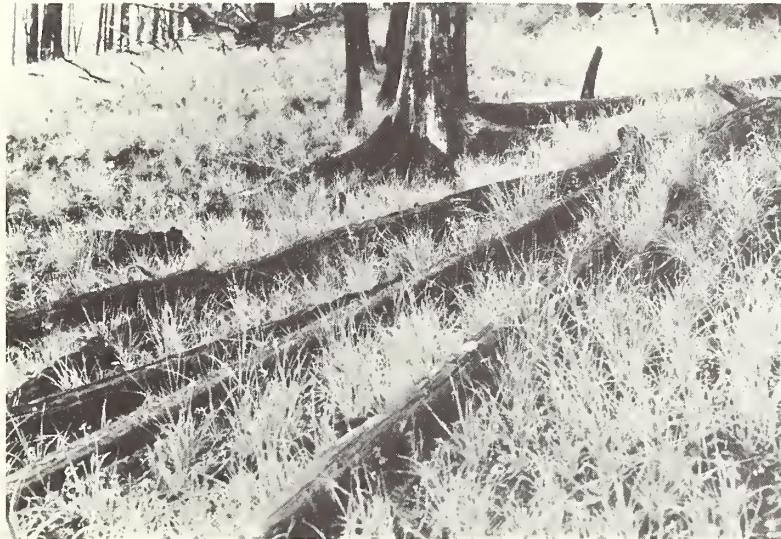
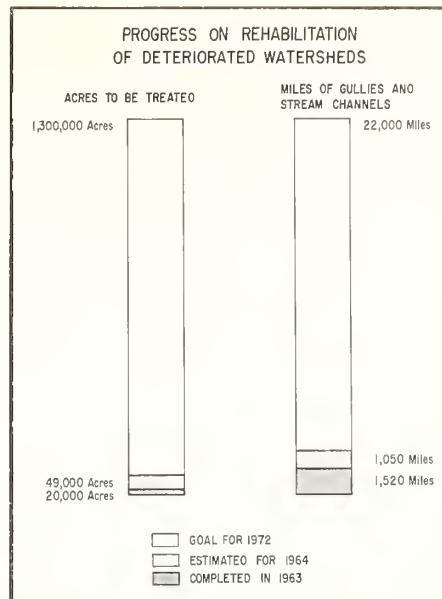
Recreation sites Water area NEW ROADS CREATED BY THE PROJECT

39.2 Ruedi marina	43.2 Lake side marina & swimming site	43.7 Lake side overlook
41.0 Ruedi camp & trailer site	43.5 Camp site	44.0 Ruedi overlook
43.1 Lake side trailer site	43.6 Picnic site	45.0 Deadman camp & trailer site

Figure H-3



Rehabilitation measures for burned areas must be carefully designed and promptly installed to prevent costly watershed damage.



Grass seeding by aircraft has halted erosion and site deterioration on this burned watershed.

Contour trenching controls runoff, prevents erosion, and protects the productive potential of fire damaged forest lands.



Figure H-4



(6) Mineral claims, leases, and special uses	\$3,794,000
--	-------------

No program increase is proposed for fiscal year 1965.

This work involves mineral leasing, special uses (other than recreation), and mineral reservations and outstanding rights administration. Occupancy and use of National Forest land for disposal of mineral or other purposes is necessary and desirable as a part of sound multiple use management. However, strict and adequate control of occupancy and mineral operations is necessary to protect forest resources from damage and to assure the highest use of the land consistent with good management of all other resources.

With close to 28,000 active mineral permits and leases in force, involving several million acres of land, and rentals and royalties in excess of \$13 million per year, the work must be kept current to protect the public interest. Annually about 5,000 mineral applications must be comprehensively reviewed and processed. The volume of mineral leases has steadily increased from 5,200 in 1951 to an estimated 30,000 in 1965. In addition, some 140 mineral reservations are being actively operated, covering 80,000 acres. These are privately-owned minerals under lands owned by the United States. The public values in the surface must be fully protected.

New mining methods and new and more efficient machinery have caused a big step-up in mining operations, both in the leasing field and in the mining of privately-owned minerals under National Forest lands. Adequate control must be maintained over mineral reservations, outstanding rights, and leases to protect the other valuable forest resources and to provide for prompt productivity restoration of surface mined lands. Failure to maintain such control has and will continue to result in serious resource losses if adequate management and control are not provided. This situation is particularly critical to the economy of many of the areas now experiencing severe economic depression where deep coal mining and iron mining have steadily declined with a resulting sharp decrease in employment. In these areas the other forest resources, such as timber and recreation, must be fully and effectively restored, developed, and utilized. Increased mining law effort is required to handle the extra work created by the Church-Johnson Act (P.L. 87-851) for the relief of mining claimants.

Another important part of this activity is the detection and elimination of unauthorized use of mining claims which constitutes trespass and interferes with the orderly administration of the National Forests. Approximately 10,000 such cases now exist that should be cleared within the next eight years. Failure to aggressively pursue such cases further complicates the problem, as it encourages others to disregard the mining laws.

Other uses of National Forest lands have likewise increased sharply. At present there are approximately 40,000 permits and easements involving almost 5 million acres of land and 60 thousand miles of rights-of-way. Failure to properly administer these special land uses could result in serious resource damage and direct monetary loss to the Government.

Television and other public entertainment broadcast stations require high mountain peaks for greatest coverage. Sites most frequently occur in National Forests. Competition for sites is heavy from other radio-electronic uses

Project (6)

for commercial but nonpublic service such as logging and pipeline monitoring and from the emergency and safety field.

Acceleration of highway construction has added to Forest Service workload as many such roads cross lands under Forest Service jurisdiction. Impact studies and close cooperation with State highway departments and the Bureau of Public Roads is required to provide adequate protection of National Forest scenic, recreation, soil, water, wildlife habitat, and timber resources.

Examples of Recent Accomplishments

Mining claims. The determination of surface rights of mining claims under the Act of July 23, 1955 (P.L. 84-167) continues to be a major activity. Following is a summary of progress to June 30, 1963:

Item	Number of areas	Acres	Estimated number of mining claims
Surface right determination to be done (revised estimate)	979	144,369,649	1,108,654
Field examinations during 1963	62	8,980,858	15,362
Total field examinations completed	946	140,882,934	1,106,588
150-day publication period expired ...	933	138,684,128	1,105,849
Determination job complete	645	94,382,677	714,575

As a result of determination of surface rights procedure, there are now 20,924 mining claims on which the claimants have asserted the validity of their surface rights. These claims are now being examined by the technical mineral examiners to determine their validity. Seven thousand four hundred twenty-three of these claims have been resolved in favor of the United States. That means that on about 139 million acres of National Forest land which included an estimated 1.1 million mining claims, the United States now has the right to manage the surface on all but 13,501 claims. This figure will probably be reduced further as some of these claims may be resolved in favor of the United States.

Mineral permits and leases. The Secretary of Agriculture has the authority to dispose of common varieties of mineral materials on all lands under his jurisdiction. However, claims continue to be located under the mining laws and require contest action to determine the nature of the material and the related legal authority for its removal. Illegal occupancy and use frequently results in severe surface damage as shown in Figures I-1-(1)-(2). Where use is properly controlled by permit, such damage is avoided and a fair price is paid to the Government for the material removed. Permits and leases for oil and gas, coal, oil shale, potassium, sodium, phosphate, and sulfur on both public domain and acquired National Forests and National Grasslands and for hard rock minerals on acquired lands are issued by the Bureau of Land Management, Department of the Interior, with the advice or consent of the Forest Service.

The Forest Service supervises the land management protection, restoration, and rehabilitation provisions of all such leases and permits. (See Figure I-2.) The volume of mineral leases on land reserved from the public domain is steadily increasing. In 1963, 11,023,665 acres were under lease. The receipts from these leases are not credited as National Forest receipts, but are collected by the Department of the Interior and distributed to the reclamation fund, to States in which the lands are located, and to the Treasury as prescribed in applicable legislation. Forest Service fiscal year 1963 mineral receipts were \$2,802,756 for approximately 4,645,037 acres of acquired lands under permit or lease. Some half million acres are under permit from the Forest Service for preliminary geophysical and geological prospecting and for common varieties. Over 51,800 acres are being actively operated under reserved right or mineral reservation.

Industrial development and utilization of mineral resources are important to local economies. For example, investments in mines and mills in and adjacent to the Clark National Forest in Missouri, already built or contemplated, amount to more than \$70 million. Royalty receipts on lead production from Federal lands in this area are expected to approach \$300,000 annually within a few years. (See Figure I-3.) Strip mining creates difficult land use and protection problems. Road construction, location of improvements, construction of dams and reservoirs, protection of soil, water, and other surface resources, and fire protection require continued vigilance. (See Figure I-4.)

Special Uses. National Forest land and other land administered by the Forest Service may be used for special purposes when such uses are in the public interest. (See Figures I-5 and I-6.) Now in effect are about 39,175 special use permits covering 68 different purposes such as pastures, sawmills, television transmitters, roads, and other desirable uses. Permits to public agencies are usually issued free; those to nonprofit organizations bear a nominal charge; and those for commercial and individual use bear a fee based on the value of the land use authorized. Fiscal year 1963 receipts for special land uses were:

Power	\$ 93,079
Other land uses	421,732
Total	\$514,811



Removal of Common Varieties of Mineral Material

Proper regulation and control over the removal of common varieties of mineral materials require constant attention by qualified personnel to prevent illegal occupancy, unauthorized removal of materials, and damage to forest resources. Many "claims" are filed for this material in the western National Forests.



Scalped Country: The quarry operators clear the surface soil of its vegetation to determine the quality and accessibility of the rock. Many quarries similar to this have only a little rock removed as shown by the white scars in the cleared areas. The rock is then found unsuitable or hard to quarry and the claim is then abandoned without adequate surface restoration treatment.

Figure I-1 (1)



Unregulated Use Can Result in Serious Resource Damage



Quarry Roads: The road at the lower right is in the bottom of the draw. When this road gets too muddy the rock trucks use the middle or upper roads. In some places there are four roads from one point to another a hundred yards apart. The roads are poorly built. They erode rapidly, leaving scars devoid of vegetation and subject to severe erosion.

Prospect Hole: In the process of digging this prospect hole the range division fence was cut and left unrepaired. The range permittee and the District Ranger repaired this gap.



Housing: The quarry man's cabin often become surrounded by trash and junk. Most places do not have sanitary facilities of any kind. The garbage dump is out the nearest door or window. Transportation for the quarry man is usually an old model car which rapidly falls apart and is scrapped for parts. Some of the older cabins have five or six car bodies in the dooryard.

Figure I-1(2)



Oil Exploration

Close supervision and control must be maintained over use of National Forest lands for oil exploration and removal to assure adequate protection and proper multiple use of other forest resources.



Terraces were required to intercept runoff and minimize erosion on the cleared areas. This photograph was taken immediately after a four-inch rainfall. The terrace dams are filled with water and the diversion ditch is carrying water into the natural drainage area.



The area cleared in connection with this oil well has been revegetated and erosion control dams installed. The range and wildlife habitat resource productivity has been restored.

Figure I-2



Mineral Development



Typical mineral development on the Clark National Forest. A mine shaft and the lead concentration mill are shown. Eight special use permits are involved in connection with this plant and the nearby community.



The new taconite town of Babbitt, Minnesota, population 2,600, is within a few miles of the Superior National Forest. Many special use permits for roads, railroads, powerlines, etc. have resulted from this development.

Figure I-3



Strip Mining



Coal strip mine spoil near Wayne National Forest, Ohio, as it was after mining was completed. Area had not yet been treated to restore surface productivity.



Six years later, black locust trees are well established on the spoil area and the adjacent field has been planted to pine trees.

Figure I-4





Santiago Peak, Cleveland National Forest, overlooks much of southern California. It is a strategic location for both radio communication and fire detection. The Pacific Telephone and Telegraph Company constructed this relay station under special use permit. The building provides space for both commercial and governmental communication use. A fire lookout tower was incorporated into the structure.



Military installations such as this radar station and related housing frequently must be built on National Forest lands because of strategic location requirements.



Honey production is another example of permitted use. In the South the industry is migratory, following the flowering seasons from Florida to Georgia. Use of a particular site may vary from year to year depending upon distribution of the blooming plants and trees and other bee "ranges".

Figure I-5

Unauthorized Use of National Forest Land by Mining Claimants



The cabin was built on the shores of Bonaparte Lake (State of Washington) to take advantage of the outstanding recreation resources of this location.

This "claim" was located in 1953. The cabin was constructed in 1958 and occupied by the claimant as a summer home. Mineral examination was made in 1956 and a contest was initiated. The claim was declared null and void and the cabin was removed in 1959.



The site has now been recovered for public recreational use. A boat dock permit has been issued to the Central Washington Council of the Boy Scouts of America.

Figure I-6

(7) Land classification, adjustments and surveys \$3,899,000

No program increase is proposed for fiscal year 1965.

This program provides for the study and classification of lands with respect to their suitability for inclusion or exclusion from the National Forests, National Grasslands, and other land areas administered by the Forest Service; adjustments of land ownership in these areas; the establishment of property lines; the maintenance of accurate ownership and status records for all lands administered by the Forest Service and the reproduction of essential administrative maps. These functions are basic to the Forest Service land management program. Ownership patterns are a first consideration in planning and installing improvements and land treatment measures and in carrying out protection work.

Land classification. A continuing analysis of the exterior boundaries and interior landownership patterns of National Forests and National Grasslands is conducted to facilitate conservation programs. Studies are conducted to determine and recommend changes in landownership or jurisdiction that would enhance opportunities for public programs to provide outdoor recreation, wildlife habitat, timber products, livestock forage, and protection of water resources. Analyses include consideration of potential purchase areas, land transfers or exchanges. Careful consideration is given to changing patterns in land use, especially on private lands, public need for National Forest resource development, opportunities for improving the efficiency of public land administration, and to analyzing the probable effects on local economies (Figure J-1).

Representative of such studies is one recently completed involving a gross area of 125,000 acres in southern Illinois. Based on study findings, the National Forest Reservation Commission recently approved establishment of a purchase unit which will connect the two units of the Shawnee National Forest. Similarly, under a contract with the Forest Service, the University of Arkansas completed a study of an area adjacent to the northern border of the Ozark National Forest. The study considered alternatives under present landownership and weighed them against potentials for National Forest programs as an assistance to the depressed rural economy. This study and supplemental data will provide the basis for recommendations with regard to National Forest programs in the area.

In cooperation with the Bureau of Land Management, Department of the Interior, continuing consideration is being given to opportunities for providing more efficient management of the public lands through specific transfers of jurisdiction (Figure J-2). Studies are being completed in Montana, Idaho, Colorado and several other Western States. Federal lands no longer needed for military or other program purposes, or lands involved in flood control or reclamation projects frequently are located close to National Forests. Analyses are made of the status and long-term administration of these lands for meeting public needs most effectively.

concrete posts; 984 miles of property lines were located, marked, and posted to standard; 1,274 miles were marked and posted to partial standard to perpetuate the location of lines (Figure J-4). This is significant accomplishment, but it must be accelerated to meet current needs in protecting Government lands from trespass, to prevent further unnecessary loss of corners (4,000 to 5,000 now being lost each year), and to further the expansion of multiple uses on Government lands without jeopardizing "good neighbor" relationships with adjoining landowners.

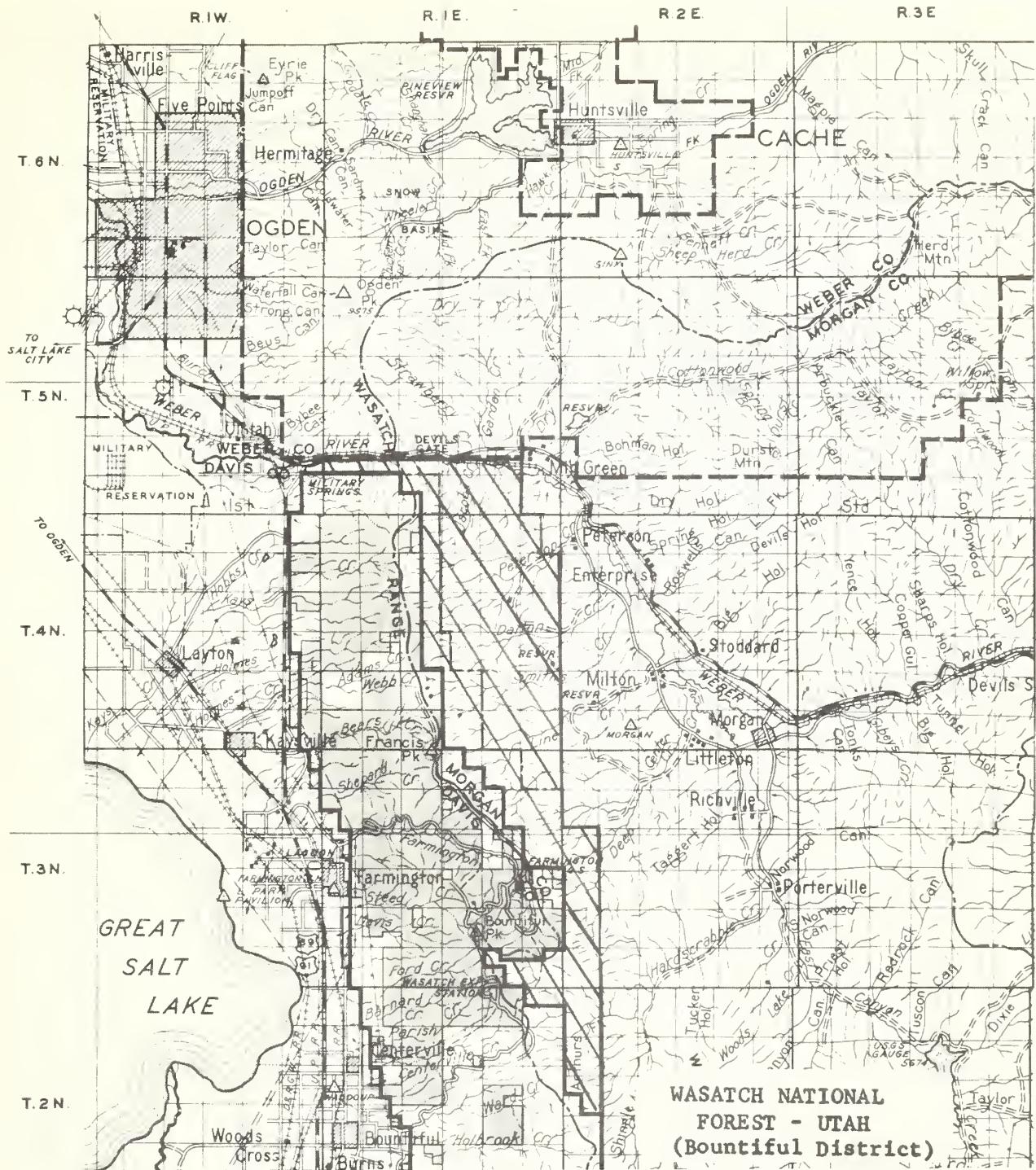
Land status records. The objective for ownership and status records is to have available on each management unit accurate and current records of all ownership and the reservations, outstanding rights, and encumbrances that affect administration of the Government's lands. There are some 170 National Forest and National Grassland management units for which this information and data must be developed and assembled. The program for installing an adequate system was initiated in 1962 with the objective of completing the job by 1968. However, only about 6% of the work was completed by the end of fiscal year 1963. Complete and accurate records of landownership and status are an essential working tool of Forest Service land managers. Records of lands in approximately 14,000 townships, or equivalent quadrangles, are being examined and recorded in the revised system. Through fiscal year 1963, 582 townships have been completed. This review is revealing about two serious errors or omissions per township in previous status records. The conversion should be completed as soon as possible. However, at the present rate of financing it would require some 20 years to complete this work. Work proposed for fiscal year 1965 includes the completion of records for the equivalent of 2.5 management units.

Mapping. The estimated mapping program for fiscal year 1965 includes:

Contour maps	3,100 square miles
Planimetric maps	7,000 square miles
Forest series maps	11 maps

During fiscal year 1963, contour maps were completed for 1,208 square miles. Work accomplished on contour mapping of additional area was equivalent to completion of another 1,717 square miles. Planimetric mapping was completed for 4,800 square miles and is from 50% to 90% complete for an additional 6,750 square miles. Eight general purposes maps of National Forests were produced. (See Figure J-5.)

Reliable planimetric maps meeting the requirements for accelerated management activities are now available for about 43% of total requirements for administering the National Forests and Grasslands. Topographic maps are available for approximately 36% of the required coverage.



Serious erosion and destruction of vegetative cover have caused the area of rugged land outside the Wasatch National Forest (cross hatched) to become a potential source of floods endangering public facilities. Public Law 87-661 added some 24,000 acres of this land to the National Forest to assure that this critical watershed area would be properly managed and protected. An appropriation of \$250,000 was made in fiscal year 1964 for land purchase within this area.

Figure J-1



An enclave of public domain lands within Nezperce National Forest is the result of an early-day mining boom now vanished. A National Forest ranger headquarters is within 2 - 6 miles of land which is now administered by Bureau of Land Management offices nearly 150 miles distant. Eight such areas in Idaho have been analyzed to determine public values and the most effective and economical administration.

Figure J-2

Land Exchange

The lands received by the Government in this 1963 exchange in the southwest include a large area of cutover pine type. These lands are satisfactorily restocking with thrifty-pine reproduction ---



They are ideally suited for multiple use National Forest management. They have good timber and recreation resource potential.



This is the Federal land that was traded. The new owner intends to develop or sell the land for residential development.

There is a large demand for potential residential property in this locality.



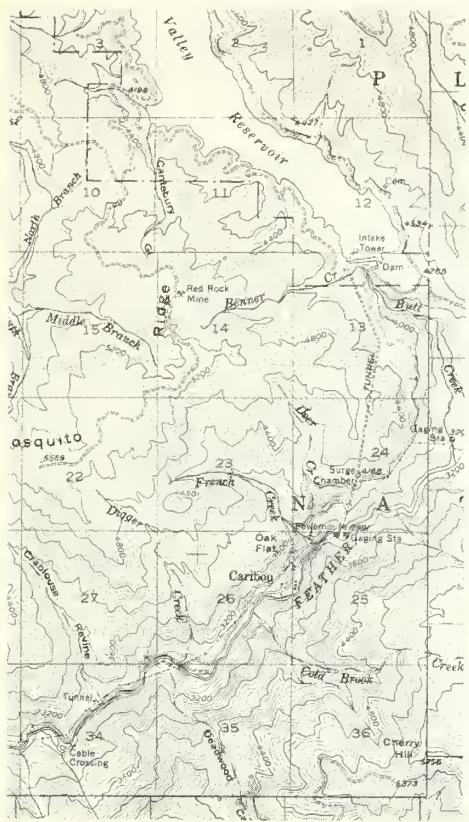
Figure J-3

Land Line Location



The completed job of land line location involves establishment of a permanent monument at property line corners and clearly marking the property lines between these corners with posts, signs, paint markers, etc. This picture from the Lake States area is an example of a standard corner monument installation and land line marking.

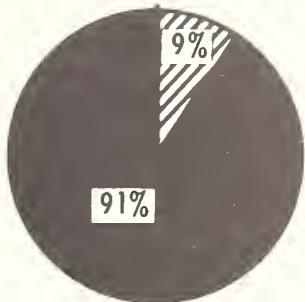
Figure J-4



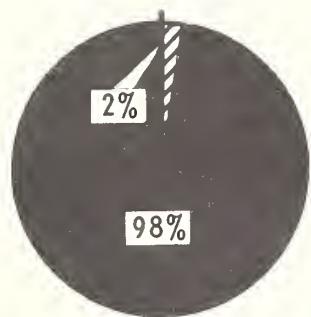
MAPPING 10 YEAR NEED

- Yet to be done
- Estimated accomplishment
1963-1964

Forest & Grassland
195 Maps



Contour Maps
355,600 Sq. Mi.



Planimetric Maps
148,900 Sq. Mi.

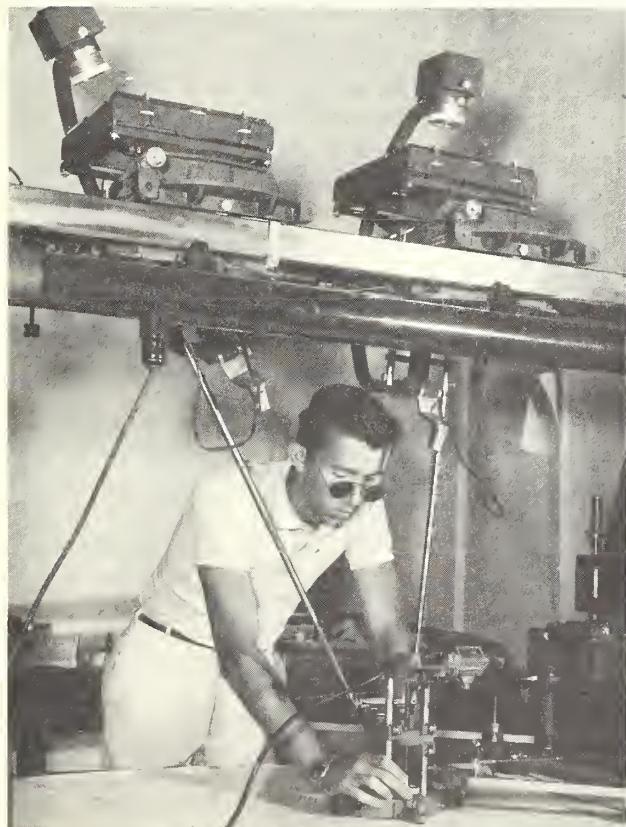
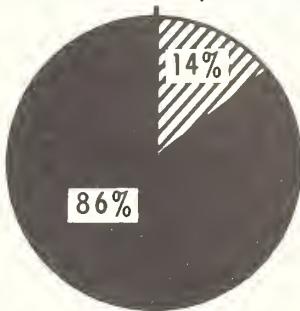


Figure J-5

(8) Forest fire protection \$23,011,000

No program increase is proposed for fiscal year 1965.

Uncontrolled fire destroys or seriously damages all forest resources. During the past five years estimated resource losses have averaged more than \$20 million annually in areas protected by the Forest Service. In addition to this critical resource loss, millions of dollars have been expended for forest fire fighting. During the past five years, firefighting costs have averaged more than \$27 million annually. Adequate fire protection can be accomplished only by elimination of fire hazards, reducing the number of man-caused fires, and by prompt and efficient detection and suppression of fires that occur. As the use of National Forest resources increases, there is a corresponding increase in the risk from man-caused fire. Fire protection must meet this impact with more fire prevention, expanded programs of hazard reduction and fuel type conversion, and strengthening of fire control forces in terms of location, adequate manpower, and more effective fire control equipment.

The fire that is prevented results in no resource loss or suppression cost. When prevention fails or fires result from lightning, rapid and adequate initial attack can control such fires at a minimum of cost and resource loss. The long-range fire objective is to hold fire losses below the level which will seriously interfere with intensive multiple use management of the National Forests and National Grasslands. It is estimated that for every additional \$1 spent for fire protection during the period 1956-1963 resulted in a fire damage saving of \$5.

The proposed 1965 budget would provide for the following estimated protection measures:

Fire prevention	\$3,300,000
Fire detection	3,200,000
Fire attack forces	13,000,000
Air operations	2,100,000
Fuel modification	300,000
Equipment development	600,000
Studies, surveys, plans, and special training ..	511,000

Examples of Recent Accomplishments

Effective fire control requires an optimum combination of qualified men, suitable machines and modern techniques. The primary objective is to prevent as many fires as possible, but when fires do start, it is important to detect them promptly and mount an attack rapidly with sufficient forces to hold them to small size to assure small loss of resources and low suppression cost. A continuing effort is directed to develop and improve machines, test newly discovered techniques and improve the direction and leadership of the total fire control job to hold losses and costs to acceptable levels.

The major key to successful fire control is the knowledge applied by fire leaders and their crews to the job at hand. Special effort is being directed to improve the training of all fire men. Particularly significant is the fire simulator developed and used for leader training. This device places fire supervisors in stress situations to cope with fire attack problems that closely simulate actual fire conditions. Programs were also developed for two fire courses using teaching machines. Work continues on developing new training devices, aids and materials. Advanced university training has been given to six professional foresters in the last two years.

Fuel type modification and breaks in critical hazard areas have proven effective in reducing the potential for the few disaster fires which result in large firefighting costs and critical damage to resources. Some work is underway on most of the National Forests with the largest fire expenditures and losses. A major test project has been started in California where the potential for fire disaster is great. (See Figure K-1.)

Particular emphasis is being given to improvement of fire prevention to further reduce the number of man-caused fires. During the past 20 years man has been responsible for 77% of the total National Forest area burned. Progress has been excellent, particularly in view of the sharp increase in forest use during this same period. (See Figure K-2.) However, the fire prevention effort must keep pace with the impacts of increasing uses which require direct contact and constant attention. Special attention is being given to the problems of children playing with matches and incendiarism. Increased fire prevention funds have provided for stronger emphasis on prevention techniques, law enforcement and trespass reporting. An important phase of prevention is the prosecution of fire law violators and the collection of damages from those who cause fires. Twenty fire trespass cases were successfully completed during the past year.

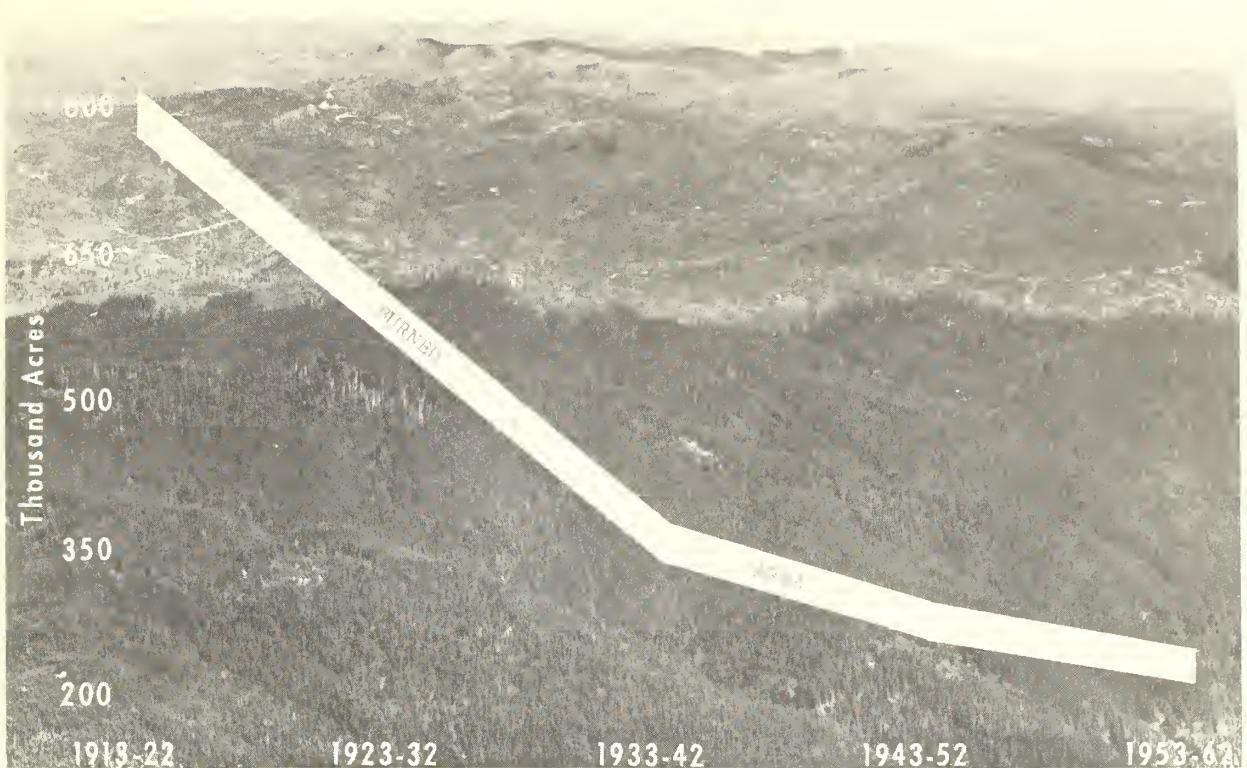
Equipment development and testing continues to provide improved fire equipment to aid the firefighting effort. (See Figure K-3.) A new light-weight fireline trencher was developed which permits a firefighter to build three to five times more fireline than he can with handtools.

Protective clothing including flame-resistant shirts, reflective heat shelters, face masks and respirators, are now in use to provide increased safety. A newly developed light-weight smokejumper suit recently saved the life of a smokejumper when the wind landed him in a fast-moving river. New freeze-dehydrated field rations proved easy to prepare and highly palatable. Automatic fire weather telemetering systems were installed at unattended field stations in eastern and western forests where fire weather data is electronically measured and telemetered to central collection points for automatic print out. Testing is in progress on airborne infrared photography system which accurately defines hot spots and fire perimeters at night or through dense smoke above major fires. Improved tanks for helicopters have increased accuracy and effectiveness of retardant drops.

Helicopter use on fires continues to increase as a result of training, additional experience of fire managers, and construction of more helispots which permit greater use in initial attack. An evaluation study is in progress on the use of helicopters for retardant dropping on initial attack instead of fixed-wing airplanes. More effective use of smokejumpers is being achieved through retrieval with helicopters after they do their fire job. Preliminary evaluations were made on two singleplace helicopter prototypes for transportation and reconnaissance work. A mechanism was developed and installed in a lead plane for retardant operations which produces smoke through the exhaust system for air marking of targets for retardants or cargo dropping. An evaluation study of retardant use by aircraft was used as the basis for national guidelines on the use and management of airtanker operations. (See Figure K-4.)

Work has been underway to establish a unified fire danger system for the entire United States. Studies on the "spread" phase of this system were completed and the first universal application will start soon.

Rural fire defense activities were intensified following the Cuban situation. The National Rural Fire Defense Committee, under the chairmanship of the Forest Service, developed and issued "A National Plan for the Protection of Rural Areas in a Wartime Emergency." This plan was distributed to all cooperating Federal and State rural fire protection agencies. Detailed instructions on updating State Rural Fire Defense plans were prepared and distributed to all National Forests and States. Plans for 17 States were revised or updated by State committees.

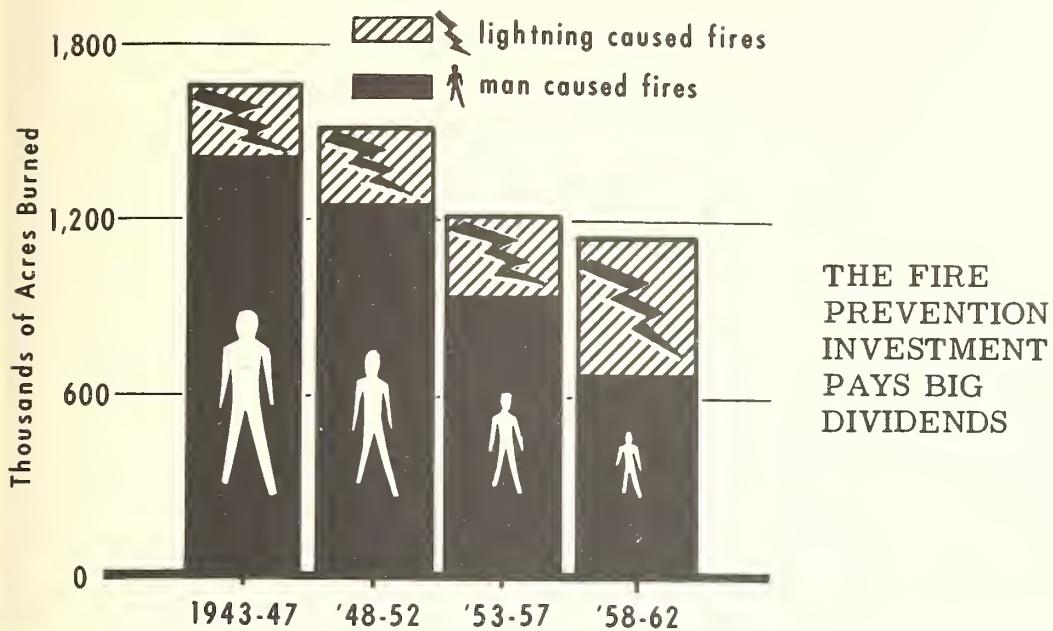


Excellent progress has been made in reducing burned area and resource losses. This graph reflects the 10-year average burned area from 1913 through 1962.



Cleared areas show fire-break preparation in flammable California brushlands. Fuel modification treatment is needed for large areas in all western Regions to reduce the potential for fire disasters.

Figure K-1



Even though excellent progress has been made in reducing man-caused fire losses, much yet needs to be done to meet the rapidly rising risk resulting from sharply increased forest use.



Recreation use has increased from 63 million visits in 1943 to 112.8 million visits in 1962. Each forest visitor represents a potential fire risk so adequate facilities and fire prevention must be provided to protect the forests from destructive fire.

Figure K-2

Equipment Development



Protective Equipment - The firefighter wears many protective items. Hard hats and gloves have been used for years. His new heat shield wards off heat and sparks. His shirt is of fire-resistant cloth colored bright orange so he can be easily seen from ground or air.



Helitanker - The improved tank on this helicopter increases accuracy and effectiveness of retardant drops.

Fireline Trencher - A firefighter can build 3 to 5 times more fireline with this trencher than he can with hand tools.



Fire Escape Shelter - This escape shelter is protecting a human occupant from heat of fatal intensity.



Figure K-3

Aircraft Use in Fire Control

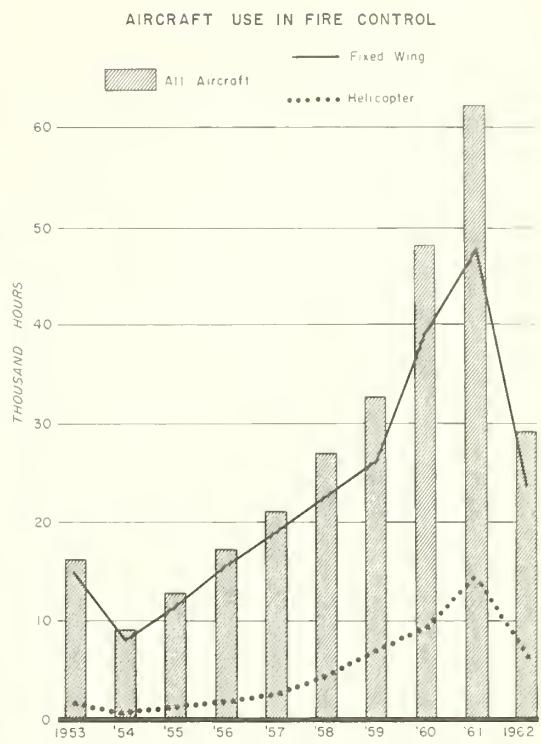


Figure K-4

(9) Structural improvements for fire and general purposes \$11,021,000

An increase of \$123,000 would be used for maintenance of dwellings, barracks, service and storage buildings, communication facilities, and other fire and general purpose improvements.

Many ranger headquarters and field projects are located in remote areas or small communities where adequate housing is not available. Unless adequate housing is provided, it would not be possible to headquarter needed personnel at these work locations. Program costs would be increased excessively and the job of managing the lands and serving the public would suffer severely. There is also a great need for additional fire control structures such as aerial bases, service buildings, and offices in outlying locations. Adequate communications facilities are mandatory for National Forest protection and administration. Obsolete telephone systems are being converted to radio networks. Inadequate radio systems are being improved to meet communications needs.

Landing fields, helispots, and heliports are essential to the effectiveness of the fire control program and multiple use management of the National Forests to make the best use of aerial operations and air equipment. They greatly facilitate rapid initial attack on forest fires, thereby increasing the chance for early control at small size which would result in a reduction of both suppression costs and resource losses. Construction and reconstruction of airport facilities such as airfields, heliports, and helispots are urgently needed.

Existing facilities must be adequately maintained and additional facilities built to meet forest management and protection needs. During the period 1963-1972, additional needs include 2,640 housing units, 2,517 service and special purpose buildings, 455 fire lookout towers, 2,000 radio installations, replacement of 3,000 miles of telephone line, and construction of 62 landing fields.

In addition to providing for the maintenance of existing facilities and GSA leasing costs, it is estimated that the following facilities will be constructed in fiscal year 1965:

Dwellings and barracks	(60).....	\$1,000,000
Fire lookouts	(30).....	350,000
Service and storage buildings ..	(70).....	1,450,000
Airstrips and helispots	(750).....	270,000
Betterment of existing structures, landscaping, and miscellaneous construction .....	.....	600,000
Water and sewage systems .....	.....	500,000
Site acquisition .....	.....	131,000
Communication facilities .....	.....	800,000
Major structures:		
Arcadia Equipment Development Center, California .....	.....	190,000
Redmond Air Base, Oregon .....	.....	100,000
Gifford Pinchot Conservation Institute, Pennsylvania (repair and remodel) .....	.....	200,000

Project (9)

Planning and design:

Regional Office and Research Station headquarters,
Philadelphia \$96,0001/

1/ In addition, approximately \$60,000 of project research funds will be used to cover the portion of the costs related to the research portion of this building.

Examples of Recent Accomplishments

Emphasis has continued on construction of dwellings and barracks to provide housing and crew quarters at locations where private rentals are not available. Field headquarters offices are being provided and obsolete offices replaced to provide adequate working space. Construction of service buildings such as warehouses, shops, and storage buildings at Ranger Stations has proceeded to fill the most urgent program needs. (See Figure L-1.) Following is a summary of the major fiscal year 1963 accomplishments:

	<u>Number of Units</u>	
	<u>Construction</u>	<u>Betterment</u>
Dwellings	128	79
Barracks and cabins	92	33
Fire lookouts	50	31
Service and storage buildings--all types ...	236	139
Offices	54	41
Airfields, helispots, and heliports	1,037	10

While this reflects excellent accomplishment, the rate of progress is still less than is needed to provide adequate facilities in a timely manner. Of the 2,640 additional housing units that are needed during the 1963-1972 period, approximately 400 or 15% will have been built during 1963 and 1964. Similarly, service building construction will have met 17% and fire lookout construction 20% of the projected need. Approximately 45% of the 1963 construction and betterment was done with National Forest Protection and Management funds, 48% from Accelerated Public Works, and 7% from all other appropriations.

High priority maintenance was accomplished on 1,870 fire lookouts, 5,600 dwellings, barracks and cabins, 700 offices, 6,600 service buildings and related utility systems, and airports. The communication network was improved by addition of 1,700 radiophones. Maintenance was provided for 19,500 radiophones and approximately 15,000 miles of telephone line. (See Figure L-2.)



Employee housing must be provided at outlying locations where rentals are not available.



Offices, garages, and warehouses must be provided to facilitate efficient forest management.



Facilities for mixing and loading fire suppressants are an important part of aerial firefighting. Plants are installed at air tanker bases.

Figure L-1



Fire lookouts are essential for early discovery of forest fires. Prompt suppression action is mandatory if resource losses are to be held to a minimum.

Fires are reported to Ranger District Fire Control Officers who direct the suppression action. The availability of good two-way radio communication is a key factor to successful suppression.



At the other end of the radio communication system are the fire crews and fire tankers that perform the actual control work.

Figure L-2

(10) Payments to Employees' Compensation Fund \$615,000

An increase of \$95,000 for Bureau of Employees' Compensation is required to reimburse the Employees' Compensation Fund, Department of Labor, in accordance with P.L. 86-767 (5 U.S.C. 785), which was enacted September 13, 1960, for benefit payments made from that fund to employees of the Forest Service who are injured while in the performance of duty. The 1965 payment will be \$614,581. The payment for 1964 was \$520,000.

Project (11)

(11) Fighting forest fires \$5,000,000

No program increase is proposed for fiscal year 1965.

This program provides for fire fighting on the National Forests and the buildup of emergency fire fighting forces under peak burning conditions. Experience has demonstrated material savings are made by having a strong force ready to discover, attack, and stop fast-spreading fires while they are small. Costs for the regular fire protection organization are financed from the National Forest Protection appropriation. The temporary buildup in forces when fire conditions are critical and for the suppression of fires are financed from the fighting forest fires activity to the extent that such needs cannot be met from the regular fire protection financing.

The calendar year 1962 fire season. An alltime record low of 85,457 acres (including 63,893 acres of National Forest land) burned in 1962. This compares to the previous low of 107,816 acres in 1937, and represents a tremendous drop from 224,394 acres destroyed in 1961. The average fire burned 7.4 acres in 1962 compared to the 5-year average of 21.4 acres. However, the 11,494 fires that occurred represent a 3% increase over the 1957-1961 5-year average. Man-caused fires exceed the 5-year average of 4,411 fires by nearly 18%. There has been an increase in man-caused fires since 1957 when a modern-day low of 3,305 fires was reached.

Nationally, burning conditions during the 1962 season were about normal in severity. Severity was above normal in California, Arizona, New Mexico, Colorado, Nevada, and Utah, much below normal in Alaska, and much above normal on the Atlantic seaboard because of drought in the spring and winter.

Fourteen men lost their lives fighting forest fires in 1962. Six were killed in aircraft accidents. On the ground, five were killed from burns, two by rolling rocks, and one by a falling snag.

The calendar year 1963 fire season. The Eastern spring fire season was very severe; 2,578 fires burned 45,236 acres in the three eastern Regions through July. This compares to the 5-year average of 1,557 fires that burned 19,562 acres for the same period. Man-caused fires were up materially over 1962 and the 5-year average. The Eastern fall fire season was very critical. Drought conditions prevailed over much of the United States east of the Rocky Mountains and were most severe in the Southern, Middle Atlantic, and New England States. Recorded fire danger reached a 30-year high in many areas. Restrictions were imposed on burning, smoking, and camping to reduce fire occurrence. Intensive prevention efforts were made in all areas.

The Western fire season was two to three weeks later than normal due to favorable weather conditions. Western Regions, including Alaska, had 8,570 fires in 1963 as compared to the prior 5-year average of 9,779 fires. Burned acreage was 54,301 as compared to the 5-year average of 203,898 acres.

During calendar year 1963 a total of 12,506 fires burned 127,965 acres (including 91,066 acres of National Forest lands).

(12) Insect and disease control \$10,852,000

No program increase is proposed for fiscal year 1965.

The objective of this program is to reduce damage and loss caused by insects and diseases to levels commensurate with uses and values involved on all forest lands irrespective of ownership. Control work is accomplished in cooperation with other Federal and non-Federal agencies. Authorization is contained in two Federal laws--the Lea Act of 1940 which deals specifically with the white pine blister rust disease, and the Forest Pest Control Act of 1947 which deals with forest insects and all other tree diseases. Both acts contain provisions for Federal cost-sharing on non-Federal land.

(a) White pine blister rust \$3,587,000

This serious disease of soft pines was accidentally introduced from Europe in the early 1900's. It has since spread to all major white pine forests in the Nation. Widespread damage has been prevented by a continuing program of control. The program of keeping to tolerable levels losses caused by white pine blister rust disease is being continued on all commercially and aesthetically important white-pine-bearing lands in the Nation. In Eastern United States the disease is largely under control on the 8.6 million acres of white-pine-bearing land selected for treatment. Remaining work involves a continuing maintenance program. In Western United States, control still is not established on 73% of the 2.8 million acres selected for white pine management (Figure M-1). Major control effort in calendar year 1962 was concentrated in the West, especially north Idaho, where future white pine lumber production is so vital to the economy. (See Figure M-2.) Major accomplishments were:

1. Thirteen million western white pine trees on 95,000 acres were treated by applying antibiotic fungicide to the basal stem by hand equipment or to foliage by aircraft.
2. Control by removal of ribes (alternate host of the disease) included:
 - (a) Initial work done on 55,000 acres.
 - (b) Rework to establish control done on 81,000 acres.
 - (c) Surveys done on 1.5 million acres in connection with initial work and rework.
 - (d) Work done to maintain control on 1.6 million acres.
 - (e) 8.6 million ribes plants destroyed.
3. Continued economic studies in the East and in north Idaho to determine more precisely cost-benefit ratios, and a tree-breeding program to develop white pine stock resistant to damage by blister rust.

(b) Other pest control \$7,265,000

Forest insects and diseases are constant and continual threats to the Nation's valuable forest resources. Annual losses are currently estimated at nearly

Project (12)

\$350 million. During the past five years, weather and forest conditions have been conducive to serious epidemic conditions which have resulted in widespread timber losses. The seriousness of the situation has been further compounded by lack of sufficient financing to provide for adequate control programs, as shown in the following summary (in millions of dollars):

<u>Fiscal Year</u>	<u>Minimum Control Needs</u>	<u>Funds Available</u>	<u>Unfinanced</u>
1959	4.5	3.2	1.3
1960	5.0	3.6	1.4
1961	6.1	4.1	2.0
1962	9.3	6.4	2.9
1963	<u>12.2</u>	<u>10.1</u> 1/	<u>2.1</u>
Total	37.1	27.4	9.7

1/ Includes \$3 million supplemental appropriation.

During this period, outbreaks left uncontrolled for lack of financing have multiplied threefold. Lack of timely control has resulted in increased damage and increased control costs. The losses resulting from delay in control of the attacking pest outbreaks far exceed what it would have cost to provide for adequate control in a timely manner.

The tabulation on the following page shows the manner in which these funds were used in fiscal year 1963, and how they will be used in 1964 and 1965.

OBLIGATIONS, INSECT AND DISEASE CONTROL FUNDS
(Exclusive of White Pine Blister Rust Control)
FISCAL YEAR 1963 AND ESTIMATES FOR FISCAL YEARS 1964 and 1965

Project	1963	1964	1965
	:(estimated) 1/	:(estimated) 1/	
<u>Forest insects feeding on or under</u> :			
the bark 2/			
Northern Rocky Mountain States ...	\$38,100	\$50,000	\$40,000
Rocky Mountain States	587,643	1,110,000	950,000
Southwestern States	157,996	150,000	150,000
Intermountain States	1,879,604	1,421,000	980,000
California	404,790	610,000	400,000
Pacific Northwest States	24,100	20,000	10,000
Eastern States	10,100	10,000	10,000
Southern States	1,309,961	1,150,000	400,000
<u>Forest insects feeding on cones, seeds, buds, shoots, or foliage</u> 3/ :			
Northern Rocky Mountain States ...	301,905	400,000	230,000
Rocky Mountain States	19,500	- -	5,000
Southwestern States	415,621	10,000	5,000
Intermountain States	134,490	400,000	220,000
California	1,500	- -	- -
Pacific Northwest States	144,019	60,000	20,000
Eastern States	172,381	30,000	10,000
Southern States	31,023	25,000	10,000
North Central States	42,829	110,000	50,000
Alaska	67,871	5,000	- -
<u>Forest tree diseases</u> 4/ :			
Northern Rocky Mountain States ...	14,375	15,000	36,000
Rocky Mountain States	15,500	13,000	72,000
Intermountain States	4,950	10,000	36,000
California	15,000	64,000	72,000
Pacific Northwest States	43,200	43,000	70,000
Eastern States	74,155	110,000	40,000
Southern States	13,569	23,000	34,000
Alaska	- -	20,000	- -
<u>Detection and evaluation</u>	963,282	1,024,000	1,695,000
<u>Methods improvement</u> 5/	- -	60,000	175,000
<u>Equipment development</u>	21,200	45,000	45,000
<u>Forest Pest Control Act administration</u>	577,916	630,676	600,000
<u>Department of Interior forest insect and disease projects</u>	667,949	1,281,988	900,000
<u>Total available or estimated</u>	8,154,529	8,900,664	7,265,000

Project (12)

- 1/ Estimates of project needs are forecast a year or more in advance of anticipated needs and are always subject to fluctuations. Adjustments are made between projects as necessary, depending on discovery of new outbreaks and expanded needs on approved projects.
- 2/ Includes Black Hills, mountain pine, western pine, southern pine, Engelmann spruce, black turpentine beetles, Ips, flatheaded borers, balsam woolly aphid, and scale insects.
- 3/ Includes spruce budworm, jackpine budworm, Douglas-fir tussock moth, elm spanworm, sawflies, Saratoga spittlebug, European pine shoot moth, white pine reproduction weevil, seed and cone insects.
- 4/ Includes oak wilt, dwarfmistletoe, and Fomes annosus root rot.
- 5/ This item provides for initial implementation of a chemical pesticide screening unit, jointly financed with Forest Pest Control Act and Research funds. Work on the unit was started January 2, 1964 and will be further expanded in fiscal year 1965. Its purpose is to screen and field test selective non-persistent chemicals in search of replacements for persistent chemicals currently used in forest insect control.
- 6/ Includes \$1,284,336 of the fiscal year 1963-1964 supplemental appropriation.
- 7/ Includes \$1,715,664 of the fiscal year 1963-1964 supplemental appropriation.

Examples of Recent Accomplishments

Effectiveness of pest detection improved by more frequent surveillance of forest lands. Public and private foresters kept close watch over their forest properties for signs of pest problems. By doing so many insect infestations were discovered in the early stages of their buildup. Early detection, in turn, permitted suppression while the affected areas were small resulting in reduced resource loss and control costs. (See Figure M-3.)

Outbreak of the western hemlock looper discovered in Washington. A severe infestation of the western hemlock looper developed suddenly in stands of immature and mature stands of western hemlock near Naselle, Washington. The threat posed by the looper to the valuable hemlock stands prompted the owners and managers of the affected lands to initiate control. Approximately 65,000 acres were sprayed by helicopter.

Prompt salvage of windthrown timber reduces hazard of bark beetle epidemics. The severe storm that struck the coastal areas of northern California, Oregon, and Washington on October 12, 1962, left an estimated 11.2 billion board feet of blowdown timber in its wake. The down timber posed a high threat to bark beetle epidemics, so public and private agencies began prompt salvage to remove the down trees before attacking beetles could develop and emerge to attack and kill surrounding trees (Figure M-4).

Logging infested trees effective in containing severe epidemics of western pine beetle in California. The epidemic of western pine beetle in the lower elevation stands of ponderosa pine in the central Sierra Nevada of California continued with 1962 losses estimated at about one billion board feet. The epidemic tended to spread eastward to higher elevations and into better growing sites. However, by expediting the logging of infested trees, the epidemic was largely contained to the lower elevation areas (Figure M-4).

Engelmann spruce beetle infestations held in check in most Western States. For the first time in many years, infestations of Engelmann spruce beetle posed no major threat to spruce stands in the Western States. A possible outbreak in Montana was averted by the prompt salvage of blowdown trees. Two centers of activity in Idaho were brought under control by logging and by spraying stumps and cull logs with pesticide chemicals. The timely cutting of green spruce trees to trap the beetles contained infestations in two areas in Colorado. Longstanding infestations in northern New Mexico remained static at a high level but sale of infested timber and the burning of logging debris were helpful in checking additional losses.

Scope and severity of spruce budworm epidemics reduced by aerial spraying. The spruce budworm has severely damaged the mixed conifer forests from coast to coast. Epidemics in Maine totalled 500,000 acres. Those in Montana and north Idaho spread and the total area of infestation there approximates 4.5 million acres. Damage levels increased on the 1.6 million

acres of infestations in south Idaho. Approximately 920,000 acres were heavily defoliated in New Mexico and Arizona, and a like acreage suffered heavy damage in Minnesota. Some of the most seriously infested areas, particularly those where additional defoliation would cause the wholesale killing of trees, were sprayed by aircraft. Excellent control results were obtained by aerial spraying approximately 1.7 million acres.

Major campaigns directed at control of chronic infestations of mountain pine beetle. The mountain pine beetle continued to cause serious losses to pine stands at several locations in the Rocky Mountain and Intermountain States. Large numbers of western white pines were killed in northern Idaho; stands of lodgepole pine were severely affected in portions of Utah, Idaho, and Wyoming; stands of ponderosa pine were heavily attacked in Idaho and Montana, and valuable sugar pines were killed in California. The large-scale campaigns to contain and suppress the infestations were continued, with encouraging results. The logging, burning, and spraying of the infested trees materially reduced the rate of tree-killing. Control work is being continued to reduce losses to tolerable levels (Figure M-5).

Southern pine beetle epidemics contained in Southern and Southeastern States. Epidemic populations of the southern pine beetle caused heavy losses in Alabama, Georgia, Mississippi, North Carolina, South Carolina, and Texas. More than one million trees were killed in the outbreak areas and major efforts were required in suppression. Through prompt and aggressive action in salvaging and spraying approximately 400,000 infested trees in Georgia, epidemics were reduced in 20 of 26 counties designated as critical. An estimated 200,000 trees in seven counties in North Carolina, and another 346,000 in a 19-county area in South Carolina were salvaged or sprayed to contain the epidemics in those States. Similar large-scale control campaigns were undertaken to suppress infestations in Alabama, Mississippi, and Texas (Figure M-5).

Logging, turpentining, and drought increase susceptibility of southern pines to attack by black turpentine beetle. Losses caused by the black turpentine beetle increased in portions of Florida, Georgia, and Mississippi. The rate of tree killing was most severe in naval stores areas deficient in rainfall, and those seriously disturbed by logging. Infestations were brought under control by spraying stumps and the basal portions of trees faced for turpentining. The black turpentine beetle is a serious pest throughout the pine belt of the Southern States each year and continuing programs in suppression are needed to check these losses.

Establishment of parasitic insects in larch stands in Idaho offer promise for biological control of the larch casebearer. The first discovery of the larch casebearer in the West was near St. Maries, Idaho, in 1957. In each year since, infestations have worsened and spread. The area of infestation in 1962 was visible on 1,400 square miles and continued spread is expected throughout the larch stands in Idaho, Montana, and Washington. Parasitic insects keep casebearer infestations within tolerable limits in the eastern United States and the Maritime Provinces of Canada. The most effective parasite was released at several locations in Idaho and recovery of progeny from liberation sites points to its establishment in the West. (See Figure M-6.)

Spread of European pine shoot moth in Western States prevented by quarantine and eradication. The European pine shoot moth, newly discovered in portions of Oregon and Washington, posed a severe threat to the pine stands in the Western States. Upon discovery of the pest, public and private agencies pooled their efforts to prevent spread by quarantine and eradication. A containment zone was established from Olympia, Washington, north to the Canadian border, west to the Pacific Ocean, and east to the Cascade Mountains. Spot infestations outside this containment zone are being eradicated. About 176 communities in Washington and 100 in Oregon were surveyed for shoot moth in 1962. Only one new infestation was found--at Aberdeen, Washington, and it was destroyed. Practical fumigation schedules have been developed and procedures now are available for fumigating pines. This, together with strict quarantine, will do much to slow the spread of the moth in the Northwest (Figure M-6).

Aerial spraying protects high-value recreational areas against tree killing by lodgepole needle miner. The lodgepole needle miner is a serious pest in the high elevation stands of lodgepole pine in the Western States. Successive years of defoliation kills the affected trees and high-use recreational areas are soon destroyed. Recent improvement in methods for controlling the needle miner permitted spraying of the infested stands, and additional areas at two locations developed for recreational use were outlined for control. Spraying by helicopter is highly effective at reasonable cost.

Large numbers of pine butterflies portend new outbreaks in pine stands of Idaho and Montana. There were many reports of large numbers of pine butterflies seen in flight in stands of western white pine and ponderosa pine in parts of Idaho, and in a stand of lodgepole pine in Montana. Damage to host trees by the larvae stage (caterpillars) was not observed but the large numbers of adults point to increases in the insect population. The last previous outbreak of pine butterfly occurred in stands of ponderosa pine in Idaho in 1954. Suppression at that time required the spraying of 190,000 acres.

Little-known insect poses threat to stands of lodgepole pine in Idaho. A tube moth, rarely found in the Western States, was discovered in outbreak numbers in stands of lodgepole pine on the Targhee National Forest, Idaho. The infestation occurred on approximately 100,000 acres where reproduction and young trees on cutover areas were severely defoliated. Methods have not been developed for control of the insect. Thus, no effort was made to reduce populations by direct means.

Oak wilt. A cooperative Federal-State program to control oak wilt, a killing disease of oaks in the Midwest and East, was continued largely on non-Federal land. Six States--Pennsylvania, Virginia, West Virginia, Kentucky, North Carolina and Arkansas--participated in the program. In 1962, 44 million acres were aerially searched for trees infected with the disease. A total of 4,389 such trees were located and treated.

Dwarf mistletoe. Dwarf mistletoe is a parasitic disease that causes serious growth loss and some mortality in western conifers. Control of this disease is largely through timber cutting and improvement practices. To this end, evaluations from data obtained by detailed surveys are needed to devise cutting and improvement prescriptions. In 1962, 105,000 acres were surveyed for this purpose.

DEPARTMENT OF THE INTERIOR
(Activities under funds transferred from this
appropriation for Insect and Disease Control)

Approximately 182 million acres of Forest and woodlands are administered by the Department of the Interior, including 8.3 million acres by the National Park Service, 2 million by the Bureau of Sport Fisheries and Wildlife, 13.1 million acres by the Bureau of Indian Affairs and 159.8 million acres by the Bureau of Land Management.

White Pine Blister Rust. There are 606,704 acres of control area administered by the Department of the Interior (424,367 acres National Park Service, 82,485 acres Bureau of Land Management, and 99,852 acres Bureau of Indian Affairs). Blister rust has been controlled on 76% of these lands: 78% on National Parks; 88% on Indian lands; and 50% on control area administered by the Bureau of Land Management. Future control needed includes: (1) maintaining control already established on some 460,000 acres, and (2) completing the establishment of control on the remaining 147,000 acres of white pine lands.

Insect and Other Diseases. Increased public demand on forest areas has emphasized the importance of maintaining them in a healthy condition. This has intensified the need for additional control work. The maintenance of insect populations at endemic levels is becoming increasingly difficult because of continued abnormal moisture conditions.

Control of dwarfmistletoe infections on limber pine continued at Craters of the Moon National Monument and on ponderosa pine on the Mescalero Indian Reservation in New Mexico. Outbreaks of bark beetle in pine at Grand Teton, Lassen Volcanic, Yosemite, Sequoia, and King's Canyon National Parks continued. A new unit at King's Canyon National Park was also treated during 1963. Four Black Hills beetle control projects were carried out in Wyoming and Colorado. Ground surveys have been conducted on two additional units in South Dakota and Wyoming. Very good results have been reported on areas treated. A Black Hills beetle infestation in Wyoming is being treated through Accelerated Public Works funds.

Spruce budworm infestations were aerial sprayed in New Mexico and Montana. A buildup of spruce budworm infestation in other areas of Montana is being considered for aerial spraying during fiscal year 1964. A tussock moth infestation has been reported in Idaho. Ground surveys have been conducted to determine the extent and severity of the outbreak.

Supplemental appropriations received during fiscal year 1963 assisted materially to abate the spread of Black Hills beetles in Colorado and Wyoming and spruce budworm infestations in New Mexico and Montana. Accelerated Public Works funds used in Oregon for forest development work have assisted in the abatement of bark beetles through elimination of host material.

STATUS OF WHITE PINE BLISTER RUST CONTROL

December 31, 1962

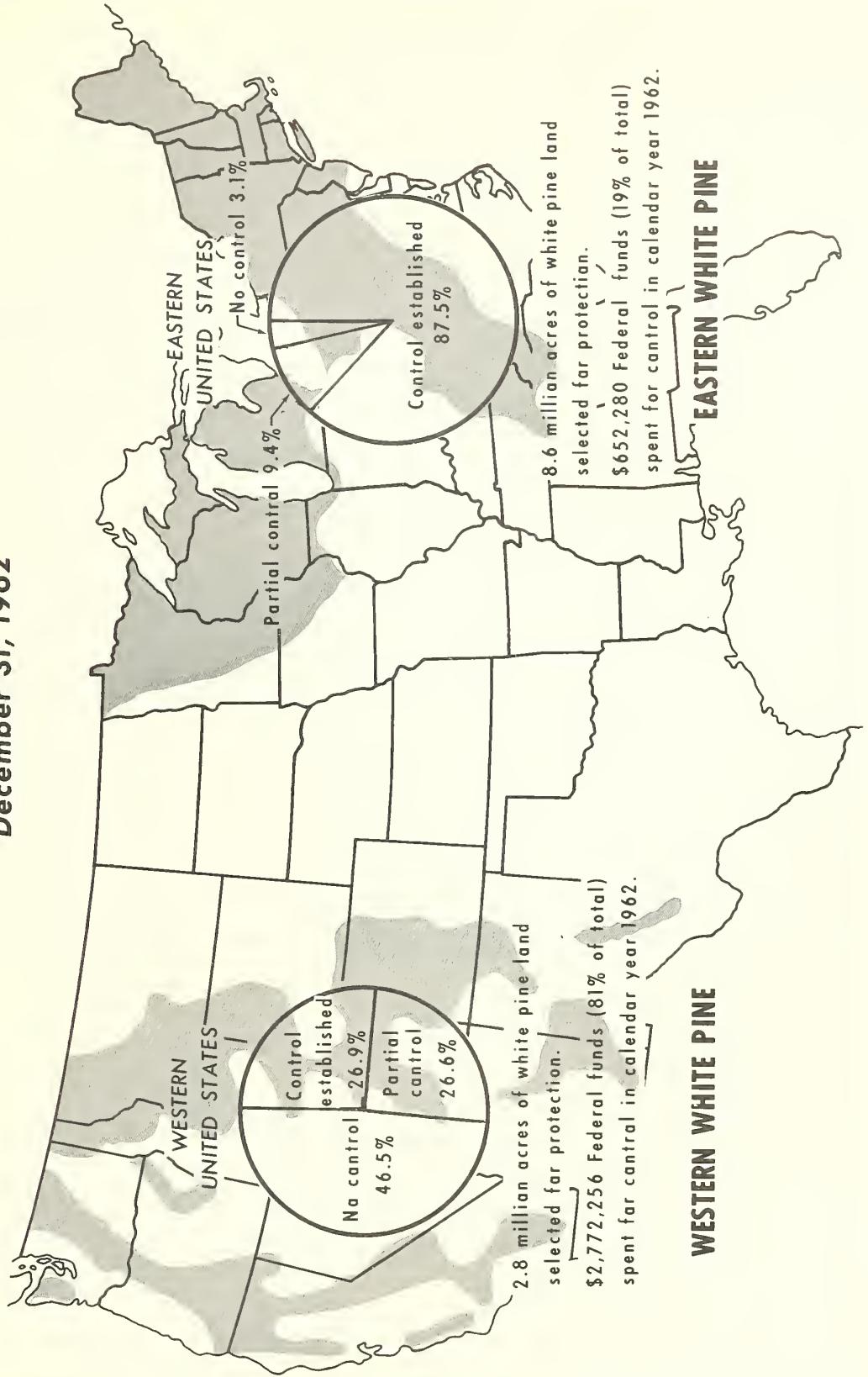


Figure M-1



Mature stand of western white pine in Idaho. By controlling blister rust, future stands are assured.

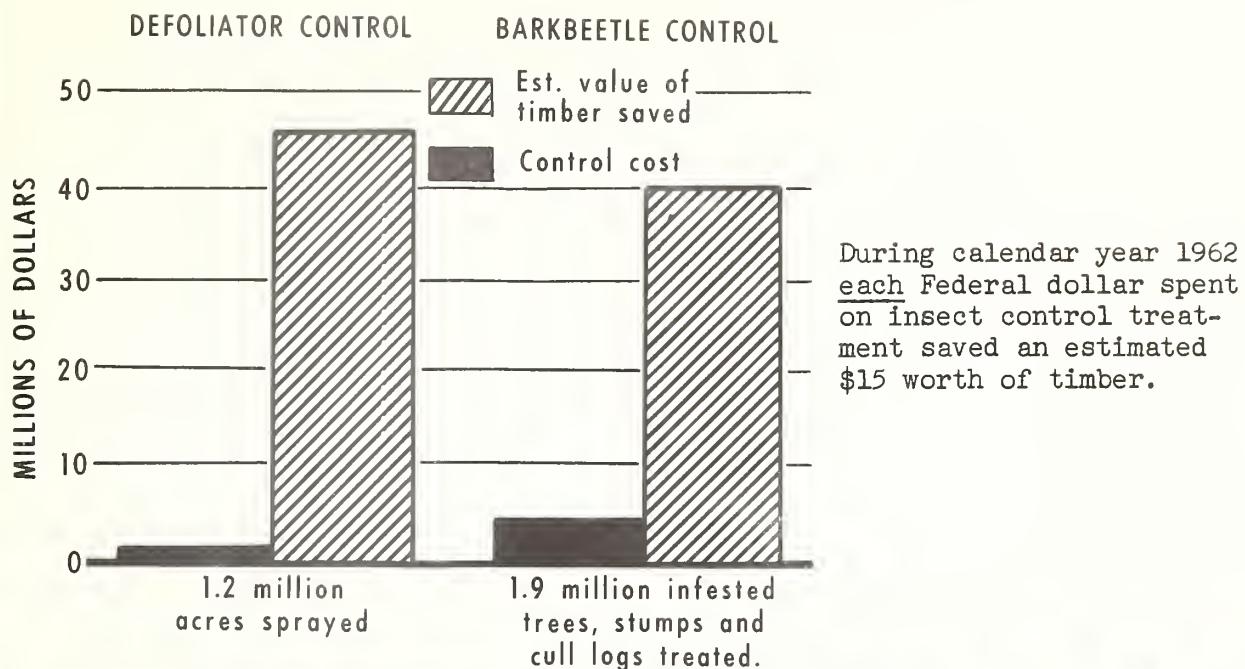


Stand of white bark pine in Glacier National Park. Protection from blister rust assures continued aesthetic values, recreational use, and wildlife habitat.



\$3,424,536

FEDERAL FUNDS SPENT FOR
BLISTER RUST CONTROL EASTERN AND
WESTERN UNITED STATES
Calendar Year 1962



Insect control is accomplished by aerial spraying and -



By direct ground treatment depending upon the method that is the safest, most effective and economical.

Figure M-3

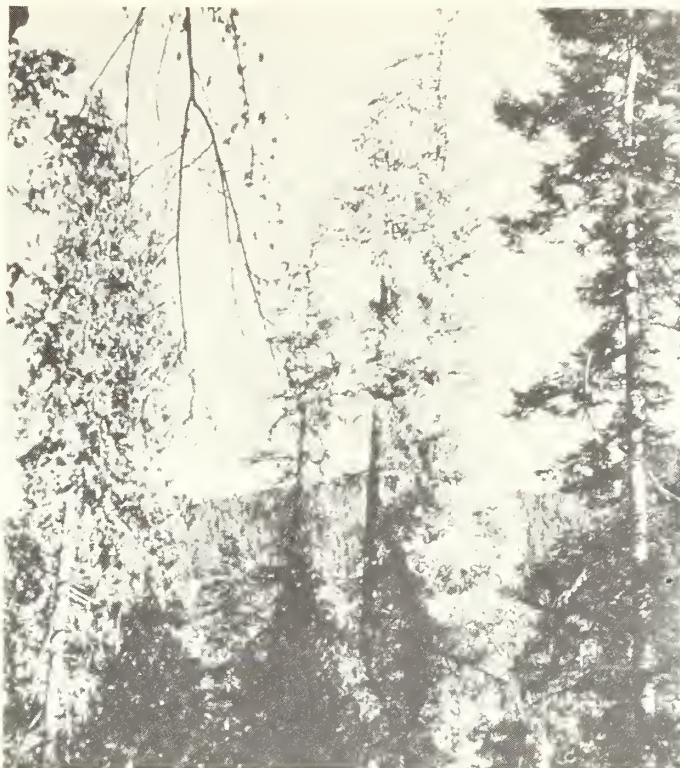


Aerial view of concentrated blowdown of Douglas-fir timber resulting from the October 12, 1962 storm. Such down timber may trigger beetle epidemics in 1964 unless it is quickly harvested.



Logging of insect-infested trees was the major control method used to contain the serious epidemic of western pine beetle in the Sierra Nevada, California.

Figure M-4



Stands of western white pine were heavily attacked by the mountain pine beetle in northern Idaho. Tree-killing on the Clearwater National Forest such as is shown here is typical of the damage to large acreages in the State.



Merchantable logs from trees killed by the southern pine beetle were milled at many locations in the Southern States. Salvage of infested trees was the major control method used to suppress beetle outbreaks.

Figure M-5



Larch casebearer severely defoliated western larch on the St. Joe National Forest, and elsewhere in Idaho. The recovery of progeny of a parasite from liberation sites points to establishment and the possibility of attaining control of the pest species by biological means.



An inexpensive nursery bed fumigation chamber used for control of the European pine shoot moth.

Figure M-6

(13) Acquisition of lands (Weeks Act) \$500,000

A decrease of \$462,000 is proposed for fiscal year 1965.

The fiscal year 1964 appropriation included \$462,000 for special land purchase needs on the Chattahoochee National Forest in Georgia and the Ouachita National Forest in Oklahoma and Arkansas. This decrease will reduce the appropriation to the 1963 level which will permit continuation of a limited program of landownership consolidation and acquisition of private lands in National Forests and purchase units.

The Development Program for the National Forests provides for the purchase of approximately 500,000 acres important for recreation development and use and 950,000 acres for other important resource management purposes during the period 1963-1972. The objective of the Weeks Act purchase program is to acquire key tracts of inholdings in National Forests and purchase units, primarily in the East, which are essential to meet the public forest resource need, and to facilitate program installation and efficient administration. This purchase program provides an opportunity to reverse undesirable use patterns. (Figure N-1).

The pattern of ownership in the National Forest system is quite irregular. While some areas are well consolidated, the general situation is one of Government lands intermingled with private and other types of ownership. One consequence is that some private inholdings are developed for purposes that are not compatible with the resource management programs operating on the National Forests. Some lands which are suitable for tree growing and other forest resource purposes are unmanaged or in need of rehabilitation. Their resource potential will not be developed and used under the present ownership. In their present condition these lands are contributing little to the economy. There is an urgent need to acquire specific key tracts of inholdings needed for the expansion of public recreation areas in the National Forests and to provide new areas for development to meet the steadily increasing demand for this type of use. Also, inholdings which are key tracts from the standpoint of effective and economical administration, or where prospects of critically needed rehabilitation are remote, should be acquired as soon as possible. It is estimated that the proposed 1965 budget will permit acquisition of 23,500 acres.

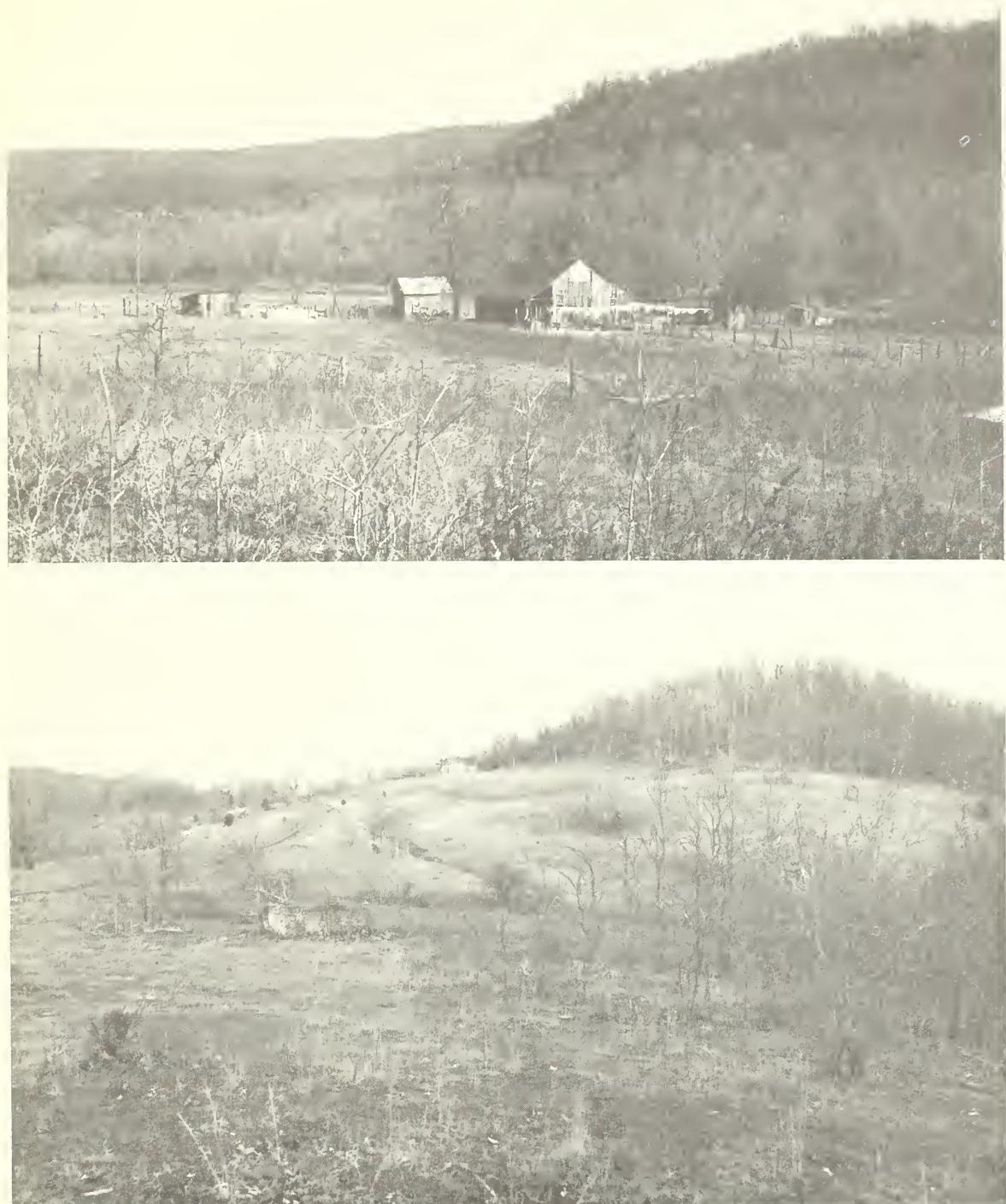
Examples of Recent Accomplishments

Weeks Act purchases generally are made from owners who are willing to sell their properties. In many cases payment by the United States of the purchase price provides funds which the owners need for investment to improve their economic situation. A study was made during 1963 of recent Weeks Act cases on eight National Forests involving 91 people who received payment for lands they sold to the United States. More than half of these people paid off outstanding debts, purchased other lands to improve their farm units or otherwise used their money to increase their income potential.

Project (13)

In fiscal year 1963 the National Forest Reservation Commission approved 108 Weeks Act purchases involving 16,815 acres in 19 National Forests located in 15 States. The approval prices averaged \$27.26 per acre. During the year, field examination of 43,970 additional acres of land was completed preparatory to appraisal and negotiations with owners for purchase. (See Figure N-2.)

Approximately 27,000 acres will be purchased in fiscal year 1964. This includes approximately 8,500 acres on the Ouachita National Forest in Arkansas and Oklahoma, and the Chattahoochee National Forest in Georgia, at an estimated cost of \$462,000 for land purchase and related commercial title costs.



Examples of key National Forest farm inholdings which owners can no longer profitable operate. Acquisition of such properties beneficially consolidates National Forest ownerships; returns marginal farm lands to forest resource production; eliminates the need for school bus, mail and other public services; and provides owners with cash to improve their economic situations.

Figure N-1



The excellent lake frontage was purchased in 1963 on the Nicolet National Forest in Wisconsin. The 132-acre tract includes 1 1/2 miles of shoreline on two inland lakes admirably suited to public recreation development. Areas such as this help to fill the pressing need for more public forest recreation opportunity.

Figure N-2

(14) Timber management research \$6,619,000

A decrease of \$47,000 is proposed for fiscal year 1965.

This change involves a decrease of \$83,000 from savings realized as a result of consolidation of research programs by closing out work formerly done at isolated locations, and an increase of \$36,000 for acceleration of that part of timber management research concerned with animal pests which damage forest trees. Emphasis would be placed on control of animal damage to seeds and trees, through habitat manipulation and through influencing palatability of nursery stock by physiological means such as with systemics and other methods to substitute for chemical repellants or chemical controls.

Timber management research develops cheaper and more effective methods of establishing, managing, and improving forests for the production of timber and timber-related products. The core of this research is determining the proper culture for over a hundred different commercial timber species in the United States. This silvicultural research includes seed production, seeding, planting, thinning, pruning, and stand regeneration measures. It involves the control of brush and other competing vegetation, and the protection of the new stand from animals. Other phases of the program deal with soil and site improvement for timber production, and the development of improved strains of trees through selection and breeding of superior types.

Timber management research also provides forest managers with information on the yield of forests in terms of various products such as lumber, plywood, poles, piling, and pulpwood, and the influence of cultural practices on the yield and quality of the stand. The program also includes research on methods of producing timber-related forest crops such as gum naval stores, maple sap, Christmas trees, and other income-producing natural products from forests.

This production-oriented research is backstopped by advanced research on the physiological growth requirements of forest trees, on variation and inheritance in tree characteristics that have economic value, and on new approaches to difficult measurement problems involved in the management of forest properties.

In all of this research the aim is to meet the Nation's need for production of timber and related forest crops. In view of the inroads on forest lands being made by urban expansion, highways, parks, and other developments, these future needs will not be met at reasonable cost unless technological progress in timber management is increased. Better methods must be found to reforest 50 million deforested acres, to keep existing forest lands continuously productive, to reduce the cost of growing the crop, and to increase its value for industrial use.

During fiscal year 1965, increasing emphasis will be given to research which will lower the cost and raise the value of timber and timber-related forest products, and thereby be of special benefit to under-developed areas. More effort will be directed toward cheaper ways to perform silvicultural operations. Attention will be given to maintaining a high standard of scientific research on the difficult basic problems which block rapid progress toward greater production efficiency.

Examples of Recent Accomplishments

Cottonwood culture. Research at Stoneville, Mississippi, has shown that success in planting and growing cottonwood requires intensive site preparation in advance of planting, cultivation during the first year after planting, and protection against fire and grazing. Cultured in this way on suitable soils, cottonwood grows very fast. Established with cuttings from selected clones, a plantation reached an average height of 22 feet in 2 years, with the largest tree 30 feet tall and 4.8 inches d.b.h. At the age of 4 years, plantations can be thinned for pulpwood. Because of this fast growth, owners of larger acreages are planting thousands of acres with cottonwood to help supply the raw materials needed at their mills. Plantings of 10 to 100 acres by small landowners are also becoming common in the Mississippi Delta. (See Figure 0-1.)

Northern seedlings grown in the South. To explore ways of obtaining larger seedlings in a shorter time, white pine, red pine, white spruce, and black spruce were grown both in Wisconsin and Florida. The relatively short natural day length in Florida was known to cause dwarfing of the Northern seedlings. However, extending the photoperiod to 20 hours with artificial light permitted growth to continue throughout the 226-day growing season in Florida, and produced seedlings that at the end of 2 years were equal to or exceeded the standards for Northern-grown transplants. Outplantings of the seedlings in the North survived as well as transplant stock from local nurseries. These studies show that trees suitable for forest planting in the North can be produced in about half the normally required time if they are grown in Southern nurseries.

Disease-resistant hybrid white pines. Progress is being made toward a more permanent solution of the white pine blister rust problem through the breeding of "rust-proof" trees. The resistance of hybrid white pines to blister rust is strongly related to the combined resistance of the parental species. Of three parent species used in a California study, western white pine is very susceptible, eastern white pine is less susceptible, and Himalayan white pine is resistant. After 11 years exposure to the blister rust fungus, all hybrids between eastern and western white pines were dead; 92% of those between western white and Himalayan white pines were dead; but 66% of those between eastern white and Himalayan white pine survived. These promising hybrids are being studied further to assure their value for commercial use. Although the eastern white pine-western white pine hybrids have low resistance to blister rust, they have shown extremely high vigor in a planting in northern Idaho. After 8 years the hybrids were about twice as tall as western white pine seedlings having the same female parent as the hybrids.

Growth of ponderosa pine related to seed origin. Two early Forest Service seed-origin studies in the Northwest, one 30 years old and the other 45 years old, show convincingly the geographic variation in growth rate and other characteristics of ponderosa pine. Growth rate increased from east to west in the range of the species. Also the inherent growth rates were related to spring-time temperatures and yearly rainfall patterns of the seed source. Bole taper, frost resistance, resistance to animal damage, time of beginning and ending of seasonal growth, and rate of seasonal growth were related to seed source, also. This basic information on the geographic variation in a widespread timber tree is helping to guide selection of the best seed sources for tree planting and tree improvement programs in the ponderosa pine regions of the West and increased production of quality timber will result.

Importance of seed origin in southern pine. Important trends are evident in the first 5-year measurements of the Southwide Pine Seed Source Study, a large cooperative effort of numerous Federal, State, educational, and industrial agencies. Agreeing with earlier evidence, planted slash pine shows limited growth difference attributable to seed source. But the other three major pine species show considerable differences. A high correlation was found between the height of loblolly pines planted in Maryland and the latitude of the seed source. Local stocks were generally above average in growth but were sometimes excelled by individual nonlocal strains of easterly or southerly origin. The incidence of fusiform rust was also found to be related to seed source--infection was least in the most westerly strains. This Southwide cooperative study will be increasingly valuable as longer performance records are accumulated and will lead to improved practices for establishing plantations with superior growth potential.

Screen and cover plantings for the anthracite region. The unsightly landscapes resulting from coal strip-mining tend to discourage potential new industries from locating in Pennsylvania's anthracite region. As part of a projected regionwide series of community action programs to improve the appearance of the countryside, the Forest Service conducted a study to determine where plantings of trees would be most effective for community improvement purposes. Forty-one community maps were prepared. These maps show disturbed areas in relation to highways and built-up sections of the communities, type of mine spoil, present tree cover, and the location and type of planting recommended. Each map, with associated tables showing acreages involved, numbers of trees required, and other pertinent data, is designed to serve as a planting guide for one community and its environs. Complementary studies are in progress to provide better guides than are now available on species selection for different spoil and site conditions. (See Figure 0-2.)

New guide for managing central hardwoods. New prescriptions for managing upland central hardwoods are contained in a Forest Service publication which makes several notable changes from previous management recommendations. It recognizes the need to use even-aged silviculture for reproducing and growing central hardwoods. It contains new descriptions and tables for classifying and identifying different degrees of site quality. It describes new concepts of optimum stocking for central hardwoods and tells how to measure and control stand densities. Although prepared specifically for use on the National Forests, principles and procedures in the guide are equally applicable to State forests, industrial holdings, and farm woodlands. Use of the guide will result in full utilization of a forest site in the production of high-quality timber under the shortest rotation feasible. (See Figure 0-2.)

Selecting trees for saturated soils. A study conducted at the Central States Station to determine the tolerance of seedlings of several tree species to saturated soil showed marked differences among the species in mortality and growth. Seventeen species were classified according to tolerance to water saturated soil conditions as follows: Tolerant--green ash, pumpkin ash, water tupelo, and willow; intermediate--eastern cottonwood, box elder, red maple, silver maple, pin oak, and sycamore; intolerant--Shumard oak, cherrybark oak, American elm, willow oak, sweetgum, hackberry, and sugarberry. Four species--green ash, pumpkin ash, pin oak, and water tupelo--grew significantly taller in saturated soil than in well aerated soil on the greenhouse bench, and some

seedlings of all species survived continuously saturated soil conditions for sixty days. The results of this study are being used to aid in selecting species for bottomlands and for reservoir sites where the environment has been changed but where trees are needed for timber production, soil protection, and recreational purposes.

Snow damage influenced by silvicultural treatment. Through proper silviculture, it is possible to reduce snow damage to northern conifers. A study showed that frequency and type of damage in jack pine stands were related to residual stand density and method of cutting. For a given type of thinning, snow damage was greatest in stands thinned to the lowest density. For comparable stand densities, roughly twice as many trees were damaged in row-thinned compartments as in those thinned selectively to remove the smaller trees. This study suggests the desirability of wider initial spacings in jack pine plantations. Red pine with identical treatments was uninjured during the same storm, indicating that one method and intensity of thinning will not be equally satisfactory for all species. This information will help landowners avoid snow damage to their plantations which are being managed for intensive timber production.

New tables show growth in managed stands. To provide up-to-date estimates of yield of red pine in managed stands, the Lake States Forest Experiment Station has issued new tables for growth and yield. They are applicable to stands of red pine ranging from 25 to 165 years of age, thinned to different densities. On better quality land, managed red pine stands are capable of producing up to 1.8 cords per acre per year of current growth. These tables will be valuable in guiding the management of red pine for the production of a wide range of products.

Plantation growth data for six important conifers. An analysis of yield from unthinned plantations of six species--slash pine, loblolly pine, longleaf pine, eastern white pine, red pine, and Douglas-fir--provides some guidelines for the proper stocking to maximize growth. The annual growth averaged over the life of the stand is greatest from 18 to 30 years of age for most species. At ages 20 to 35 the cubic volume yield of 200 trees per acre is more than 50% of the yield from 1,000 trees per acre and the yield from 600 trees is 90 to 98% of the 1,000-tree yield. Based on average planting costs, there are no positive earnings for slash pine during the 15- to 20-year growth period on stockings beyond 800 trees per acre. This information is of value in planning reforestation and in managing planted forests.

Care needed in thinning western hemlock. Decay caused by fungi that enter through wounds on residual trees made during thinning is a factor that must be considered in thinning forest stands. Recent studies, made 6 to 8 years after thinning in 37- and 55-year-old Douglas-fir and western hemlock, indicate that little serious decay occurred in Douglas-fir but 61% of injured hemlock trees contained some decay. The occurrence of decay increased with increase in size of wound and was greater in basal wounds than in wounds higher on the tree trunk. Implications are that logging injury decay will be minor in Douglas-fir, at least within the rotation ages now planned. However, special care will be necessary in thinning hemlock, and shorter rotations may be necessary to limit decay losses in thinned stands.

New treatment to stimulate gum flow. The sulfuric acid solutions now used to stimulate oleoresin flow from southern pines are corrosive to metal equipment and also require special safety precautions in handling. Forest Service scientists discovered that 2,4-D and related compounds stimulated gum flow in slash pine but were lethal to longleaf pine. In slash pine the herbicide stimulant is resulting in as much gum flow as sulfuric acid. Furthermore, it opens new possibilities for development of disposable cups and gutters from gum collection, using materials that are not acid-resistant and much less costly.

Wood density inherited. The specific gravity or density of wood largely determines its pulp yield and strength properties. Studies in forest genetics have now shown that specific gravity is strongly inherited in slash pine. Modest gains in average specific gravity of trees in plantations can be made by selecting parent trees for high specific gravity. This information will guide future tree breeding aimed at increasing pulp yield and strength.

Cottonwood Culture



Clearing experimental planting site on batture land along the Mississippi River near Stoneville, 1958.

Cottonwood stand four years later---



---has already produced pulpwood as a byproduct of the first thinning.

Figure 0-1



Typical anthracite mining community bordered by unsightly areas of strip-mine spoil. These areas can be successfully planted with trees to stabilize the soil and beautify the area surrounding the town.



Silviculture studies have resulted in new guides for growing stands of high-quality central hardwoods such as these.

Figure 0-2

(15) Watershed management research \$2,713,000

An increase of \$36,000 would be used to strengthen the technical basis for management of National Forest watersheds and adjacent water-producing mountain lands. The proposed increase would be used primarily for studies of stabilization and control of land slides on logged steep slopes and studies of techniques for preventing siltation and damage to gravelly salmon-spawning beds in the coastal streams of southeast Alaska.

Watershed management investigations are aimed at development of methods and techniques for managing forest and related range watersheds to: (a) increase water yields or improve the timing of water yields under a variety of climatic, soil, geologic, vegetative and topographic conditions by changing the pattern, density or type of forest cover; (b) give adequate protection to soil and water resources while forest and related rangelands are being used for timber production, grazing of domestic livestock and big game, wildlife habitat and forest recreation; (c) rehabilitate forest and related rangeland watersheds that constitute serious sources of damaging flood runoff and sediments; and (d) aid forest soil development and improvement.

Between half and three-fourths of the water flow of the United States originates in forests, associated rangelands and alpine regions which form the headwaters of all major river systems. Generally accepted estimates of water demand indicate a doubling by 1980, and the most logical place to look for additional supplies of good quality water is in these headwater regions. However, there is ever increasing demand to use these lands for other products and services and the manner of their management can make the difference between beneficial, well-regulated, sustained streamflow of good quality or erratic and silt-laden flow of destructive character.

The objectives of the watershed management research program in fiscal year 1965 are to develop practical guides for the management of forest land for improving the yield of good quality water; to improve forest and range soils for better watershed control, and to improve and stabilize unsatisfactory watershed conditions. Highest priorities will be given to improving the management of snow in the forest and alpine zones of the western mountains where the snowpack is the main source of water for summer stream flow; to better management of wetland forests in the northern Lake States and the coastal plains of the Southeast where extensive areas are poorly drained and of low forest productivity; to ways of manipulating forest cover to increase municipal water supplies and at the same time protect the quality of the water; to develop timber harvesting techniques to prevent erosion and landslides on steep mountain slopes; to improve management of high elevation ranges and chaparral forests to assure watershed stabilization; to further development of watershed protection standards for logging road construction; and to development of methods for rehabilitation of severe gully-eroded areas of the Southeast.

Examples of Recent Accomplishments

Loblolly pine best for erosion control in Mississippi. Litter production tests have confirmed the choice of loblolly pines as the most effective species for reclaiming the extensive eroded areas of north Mississippi and west Tennessee. There were marked differences between various strains of loblolly, but at four years of age all strains of this species had deposited more than

twice as much protective needle mulch as the other southern pines in the test. This resulted partly from faster growth, but even among trees of the same height, litter production of loblolly was best. Ability to supply large amounts of litter at an early age reduces the time required to stabilize eroding soils. Within 8 to 10 years a planted stand will completely cover the ground with a mat of needles. (See Figure 0-3.) Since loblolly survives as well as any available species and is adapted to a wide range of sites, it has been widely used on the Yazoo-Little Tallahatchie Flood Prevention Project, which involves the world's largest program of erosion control plantings.

Tests show no herbicidal contamination of public water supplies. Streamside vegetation uses large quantities of water and its removal often adds substantially to domestic and industrial water supplies where supplies are critical. In anticipation of the possible use of herbicides for reducing water consumption of streamside vegetation above municipal reservoirs, the pollution effects of phenoxy herbicides were studied near Newark, New Jersey, and Pennsylvania State University. Immediately after spraying the vegetation along the streambanks there was a slight odor in the water samples, but no further contamination was found until the first large storm, and none thereafter. Even at the highest point contamination was in barely detectable amounts. After the first day of treating, no contamination was found either in the immediate vicinity or downstream below the confluence with a larger stream. Spraying with chemicals can be a cheap and effective way to remove unwanted vegetation if side effects are not hazardous.

Long-time forest protection reduces water yield. Partial analysis of a 50-year streamflow record shows a significant reduction in annual runoff on the 491-square mile Sacandaga River watershed in the southeastern Adirondacks, the result of an alleged increase in forest density. These studies have been made as part of a program to evaluate the relation of forests to water supply and to guide watershed management programs. There have been reductions in average runoff over the period of record of 4.02 inches during the October to April dormant season, and 0.79 inch during the May to September growing season. This indicates the main effect of long-term protection might be in increasing water losses through greater snow interception during the dormant season. Continued study will determine more precisely what change in vegetation actually occurred.

Quick erosion control with chemical--a possibility. Instant erosion control on burned southern California watersheds now seems to be a distinct possibility. A wetting agent applied to naturally non-wettable soils on a 60% slope reduced surface runoff 34% and erosion 94%. The chemical reduces the surface tension of rain water and allows more rapid penetration through the surface layer of soil. It has proved particularly effective during heavy, intense storms.

Water savings from forest cutting lasts many years. On high-elevation sites in the Sierra Nevada, savings in soil moisture in the first year after logging were 7 inches, and significant but decreasing savings are likely to last for 16 years. Total savings in water in the 16-year period is estimated to be

34 inches or nearly three acre-feet of water for each acre logged. This means more water available for streamflow and is of great significance in a State where water supplies are critical. In areas of deep snowpacks where snow covers small trees and lower branches of larger trees for long periods of the year, water savings following logging would persist even longer than the summer soil moisture savings here reported. Thus treatments to increase water yields would not have to be repeated annually.

Hardwood defoliation may increase water yields. Watershed research at the Coweeta Hydrologic Laboratory in southwest North Carolina has demonstrated conclusively that timber cutting, by reducing evapotranspiration losses, can sometimes substantially increase streamflow yield without attendant increases in stormflow or soil erosion. Under emergency circumstances of low water supplies or drought it may be desirable to obtain a temporary increase in water yield without cutting the forest stand. Chemical defoliation to temporarily reduce transpiration loss is one of the more promising techniques. A recent Coweeta study using three plastic-covered plots provides comparisons of water use by fully-leaved and defoliated forest trees during one growing season. Foliage on all plots was allowed to develop naturally until late June, when two of the plots were sprayed with a commercial weed killer, the third being retained as a control. One week later virtually all foliage on the sprayed plots was dead. After spraying there was no measurable water loss from the two defoliated plots for the rest of the growing season, while the full-foliaged trees used almost 5 inches of water per month during midsummer, the total water loss being equivalent to about 10 inches of rainfall. It is probable that the water savings would have been greater had the plots been defoliated earlier in the year.

Peat types control water behavior in bogs. The water supply in the Lake States is recognized as the backbone of the recreational and industrial development in that region. This supply is influenced by the 10 million acres of forested bogs that occupy the headwaters of three vast drainage systems--the Mississippi, the St. Lawrence, and the Hudson Bay basins. The manner in which these wetland areas influence the water resource is still speculative, but recent studies indicate that these bogs are highly variable and that some may be more effective conservers of water than others. For example, undecomposed sphagnum moss peat loses water easily. Partially decomposed moss peat, aggregated peat, and sedge peat are not easily drained. Thus, a specific change in water table in the loose, porous, moss peat involves a great deal more water than the same change in water level in the more dense aggregated and sedge peats. In one of the bogs studied, a great deal of the storage capacity is made available in the moss peat horizons if the water table is lower a short distance from the surface. However, additional lowering of the water table into the more compact aggregated and sedge peats provides relatively little additional storage capacity. Thus the role of a particular bog as a storage reservoir will depend not only on the depth to which the water table drops but also on the type of peat material in the bog.

Project (15)

Artificially increased snowdepth extends period of streamflow. Accumulation of snow in drifts at high elevations in the Rocky Mountains provides efficient water storage to meet late season demands. An 8-foot snow fence used in a study in Colorado to aid natural drifting of snow caused increased snow accumulation so that by July 1 there was the equivalent of 700 cubic feet more water per linear foot of snow fence than was found on an unfenced check area. This is equal to one extra acre-foot of water (325,850 gallons) for each 62 linear feet of snow fence. In mid-August, almost half of this snow still remained and there was none on the unfenced area. Because there is only slight loss from evaporation, this is a very efficient system for storing water during the summer months.

Drainage of wetland forests improves tree growth. Preliminary results of a controlled drainage study in west-central Florida indicate that height growth of a four-year-old slash pine plantation was as great in one year after drainage as in the previous two years before drainage; survival of a one-year-old slash pine planting on a drained site exceeded 95% and growth was excellent; and 20-year-old slash pine showed excellent growth response and increased vigor of the tree crowns. The drainage system in this study has effectively reduced soil water levels for a distance of 300-500 feet from the primary canals.



Newly planted loblolly pine on severely eroding lands in the South and Southeast quickly provides a protective ground cover of pine needles, effectively stopping the erosion and improving the land for forest production.



After 10 years of tree growth the gully has been stabilized, the banks have reached the "angle of repose", and heavy loblolly pine litter protects the soil.

Figure 0-3

(16) Range management research \$1,161,000

No program increase is proposed for fiscal year 1965.

Range management research aims to find the best and most practical means to manage, improve, and maintain the productivity of forests and related lands used for grazing domestic livestock. It encompasses a variety of activities including: (a) determination of management systems and grazing intensities for the many different range types and conditions and properly coordinated with other uses; (b) development of range improvement measures such as conversion of low-value vegetation to desirable forage plants through prescribed burning, (c) determination of characteristics, responses, and requirements of range vegetation and classification of range condition and trend through studies of plant ecology, physiology, and taxonomy, and (d) determination of the identity and ecological relations of rodents, insects, and disease to range vegetation as a basis for indirect and inexpensive control.

Grazing is the largest single use of land in the United States and as such constitutes a substantial portion of our agricultural economy. About half the total land area of the contiguous 48 States, some 940 million acres, is grazed by domestic livestock, and all of it is important for its wildlife values. These lands furnish forage for about one-half of the beef cattle and three-fourths of the sheep for at least 6 months of the year. A total of 560 million acres is forested or forest-related rangeland. Some 240 million acres of this is in Federal ownership and blankets the headwaters of the major rivers.

Vast areas, particularly in the Western mountains, have been damaged by past land use practices to the point where grazing is seriously affecting the quantity and quality of water produced. Moreover, present range forage production is far below the potential, on the average only half or less of potential, and falls far short of meeting the demands for livestock and game grazing. Demands on the forest ranges for all uses are sharply increasing. As a result, difficult problems continuously arise in the conservation and coordination of use of these lands. In the West, these lands pose many problems because of the variable and often droughty climate, highly erodible soils, and vegetation that will not withstand close grazing use. In the South, integration of grazing with timber production poses serious problems, particularly to small woodland owners. Furthermore, use by wildlife on all lands has to be carefully correlated with livestock grazing. Superimposed on top of this, particularly in the West, is the fact that nearly every forest range acre is of importance as watershed, either as a producer of water or as a potential producer of debilitating sediment.

Methods of management must be found to allow the forage to continuously renew itself in keeping with other uses. Also sorely needed are surefooted but less costly methods of range-watershed rehabilitation and sharper criteria and methods for use by the range administrator and rancher in judging trends in range improvement or deterioration. Range research

must be planned and carried out so that its results can be coordinated with and add to the findings of other Forest Service research on wildlife, timber production, watershed management, and recreation. The results are needed to harmonize multiple use management.

It is intended to move ahead on the highest priority studies in 1965. These include: increased emphasis on ecology and physiology of forest range vegetation as a basis for improved range management; studies of improved management systems and grazing intensities for the high mountain ranges of the Intermountain West, the forested ranges of California and the Pacific Northwest, the annual plant ranges of California, and in Idaho the cheatgrass and the grass-herb types on steep granitic soils; conversion and management of the woodland and chaparral type in California and Arizona; studies of gophers and other range pests in the Rockies; comparison of pellet seeding with success and costs of other seeding methods in New Mexico and Arizona; rehabilitation of mountainous livestock and elk ranges of the Northern Rockies; range site evaluation, management, and type conversion in the Ozarks; integration of cattle grazing, timber production and wildlife in the South; publication of a westernwide evaluation of range forbs; studies of range inventory-analysis techniques required in public land administration.

Examples of Recent Accomplishments

Management of semidesert cattle range. A recently terminated study in southern New Mexico shows that flexibility in cattle herds is necessary to adjust for the large fluctuation in forage produced from year to year on semidesert grassland ranges in the Southwest. Since 90% of the perennial grass growth required for year-round grazing occurs in the summer and shipping time is in November, balancing of herd numbers with the forage crop is most practical at this time. A herd with a ratio of four yearlings to six cows is desirable because it permits up to 40% reductions in animal numbers through selling all yearlings in years of poor forage growth. Best use and maintenance of these ranges are achieved by grazing tobosa grasslands during the summer growing period when it is most succulent and palatable, reserving the black grama grasslands for fall-winter-spring use when the grasses are dormant.

Crested wheatgrass makes good lambing range. Research has shown that past reluctance of ranchers to use range seeded to crested wheatgrass for lambing in northern New Mexico is unfounded. In fact, in a 3-year cooperative study with New Mexico State University, an increase in income of as much as 27% was realized by shifting to crested wheatgrass during the lambing period. Cash income was higher where seeded range was used in conjunction with native range, and the investment in range seeding was recaptured in about 4 years. (See Figure 0-5.)

Use of crested wheatgrass for lambing not only required fewer acres, and therefore resulted in more efficient use of the land, but it permitted

resting the native range until the forage plants there were ready for grazing and more productive. This deferment has resulted in improved range conditions on the native range.

Converting low-value hardwood stands to grass. Ozark forest ranges with low capacity for hardwood timber production can be converted to highly productive rangelands while retaining good soil and water conservation practices. One acre of forest range improved by spraying, seeding, and fertilizing can produce as much forage as 20 to 100 acres of unimproved forest range. Spraying alone (with 2, 4, 5-T) greatly increases herbage production. However, on deteriorated forest ranges it is necessary to seed grasses or most of this increase will be undesirable weedy species. Grass establishment is improved by a seedbed preparation treatment of summer burning. For many years differences of opinion have led to indecision as to the best management methods for low timber capacity areas. This research adds to the knowledge of improved practices that are profitable. (See Figure 0-6.)

Differences in decline of protein in forage. The value of forage plants in maintaining livestock weights is related to the amount of digestible protein in the forage. Studies in timbered zones of eastern Oregon show that the most prevalent grasses in open areas undergo a severe drop in protein 3 to 6 weeks before a like occurrence in grasses and sedges of timbered rangelands. Although dates of decline in nutritive value have been found to differ from year to year, the general contrast between periods of decline for the two types of forage suggests encouraging possibilities for development of new grazing systems to take advantage of the inherent differences in nutritive characteristics of the different vegetation types on mountain grazing land.

Pine plantation produces both timber and livestock forage. Pine plantations in the Southeast can be made to yield large amount of forage and beef as well as timber. These results are being obtained in an experiment to study the feasibility of harmonizing cattle and timber production on intensively managed areas in southern Georgia. Slash pine seedlings were planted in January 1957. The test units were cultivated until the spring of 1960 when four grasses were planted on areas without trees, with trees spaced 12' x 12', and with trees spaced 20' x 20'. Grazing was initiated in the spring of 1961 when trees averaged about 12' high. Average annual beef gains of 142, 182, 208, and 244 pounds per acre were obtained from pastures planted to carpetgrass, Coastal bermuda, dallisgrass, and Pensacola bahia, respectively. Pastures with no trees, with trees spaced 20' x 20', and those spaced 12' x 12' gave liveweight gains per acre of 233, 192, and 157 pounds, respectively. These results, though preliminary, indicate the best species of grass and optimum spacing of trees to achieve maximum returns from grazed slash pine plantations.

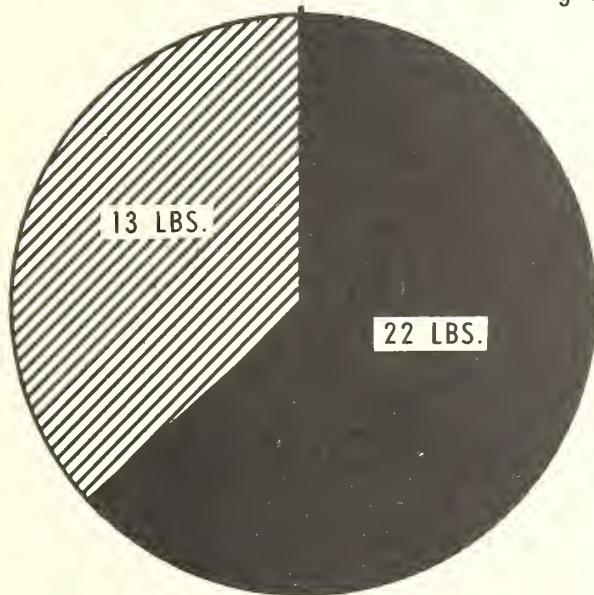
Adequate supplemental feeding is profitable on Southern forest ranges. More liberal feeding of protein supplements, such as cottonseed cake, is necessary for highest returns from range cattle grazing forest ranges in the South. These are the findings from a study conducted in central Louisiana. Cows grazing yearlong on longleaf pine-bluestem range were fed a cottonseed cake supplement of 373 pounds during the fall and winter, at a cost of \$11.30 per cow. The herd produced an average calf crop of 83%, weaning weights at 7 months were 433 pounds, and gross annual income per cow was \$78.80. In contrast, the average herd in this area receives only 105 pounds of cottonseed cake per cow at a cost of \$3.18, produces a 53% calf crop with weaning weights of 253 pounds, and has a gross annual income of only \$30.58 per cow.



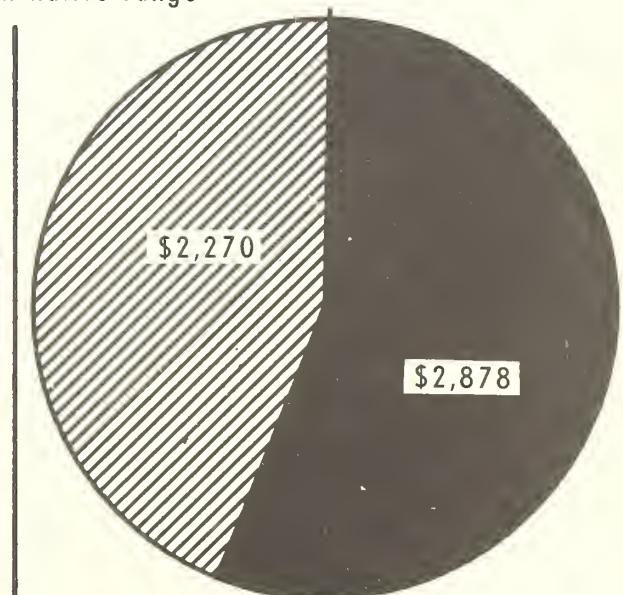
LAMB PRODUCTION

NET RETURN TO OPERATOR

 Lambing on crested wheatgrass
 Lambing on native range



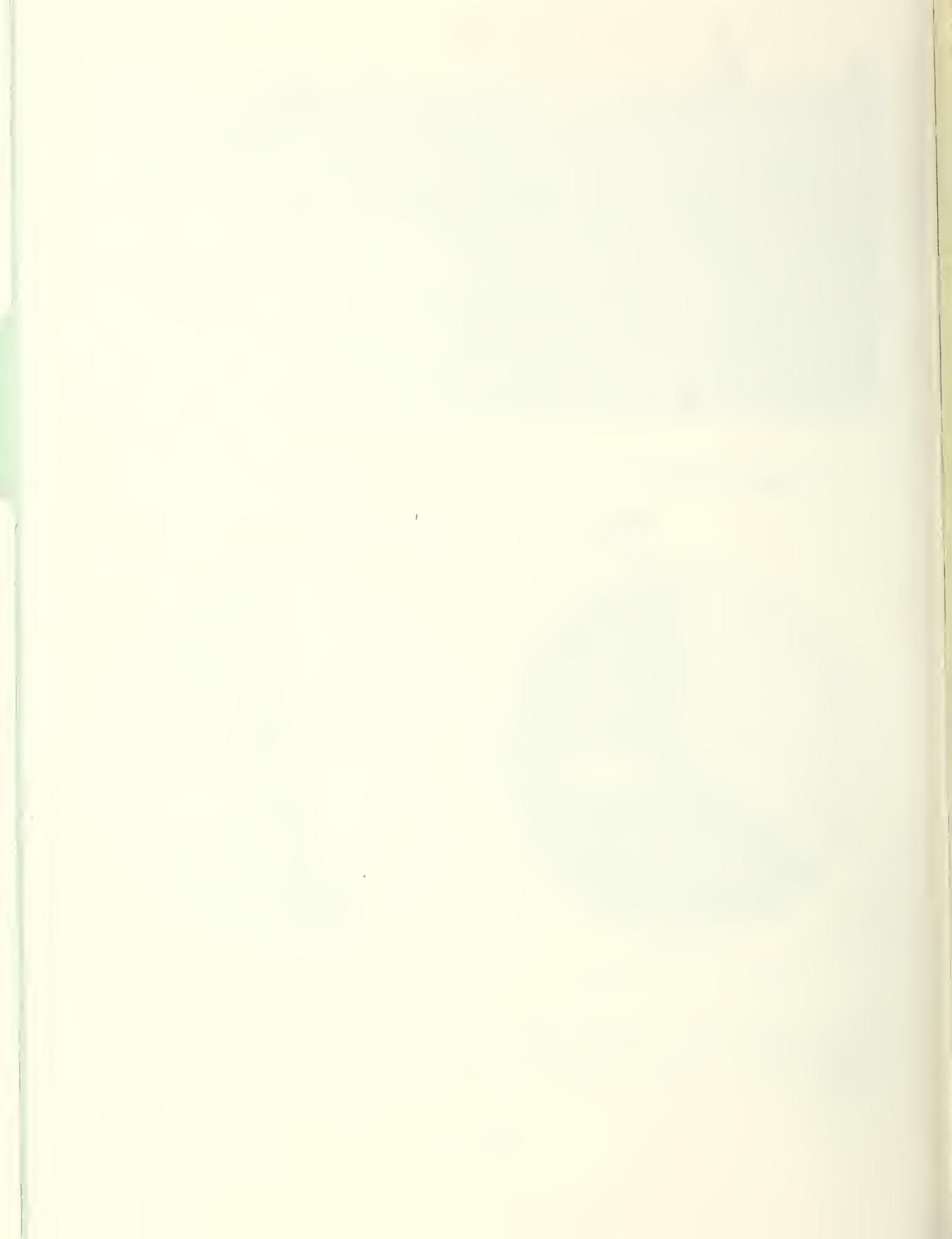
POUNDS OF GAIN PER ACRE

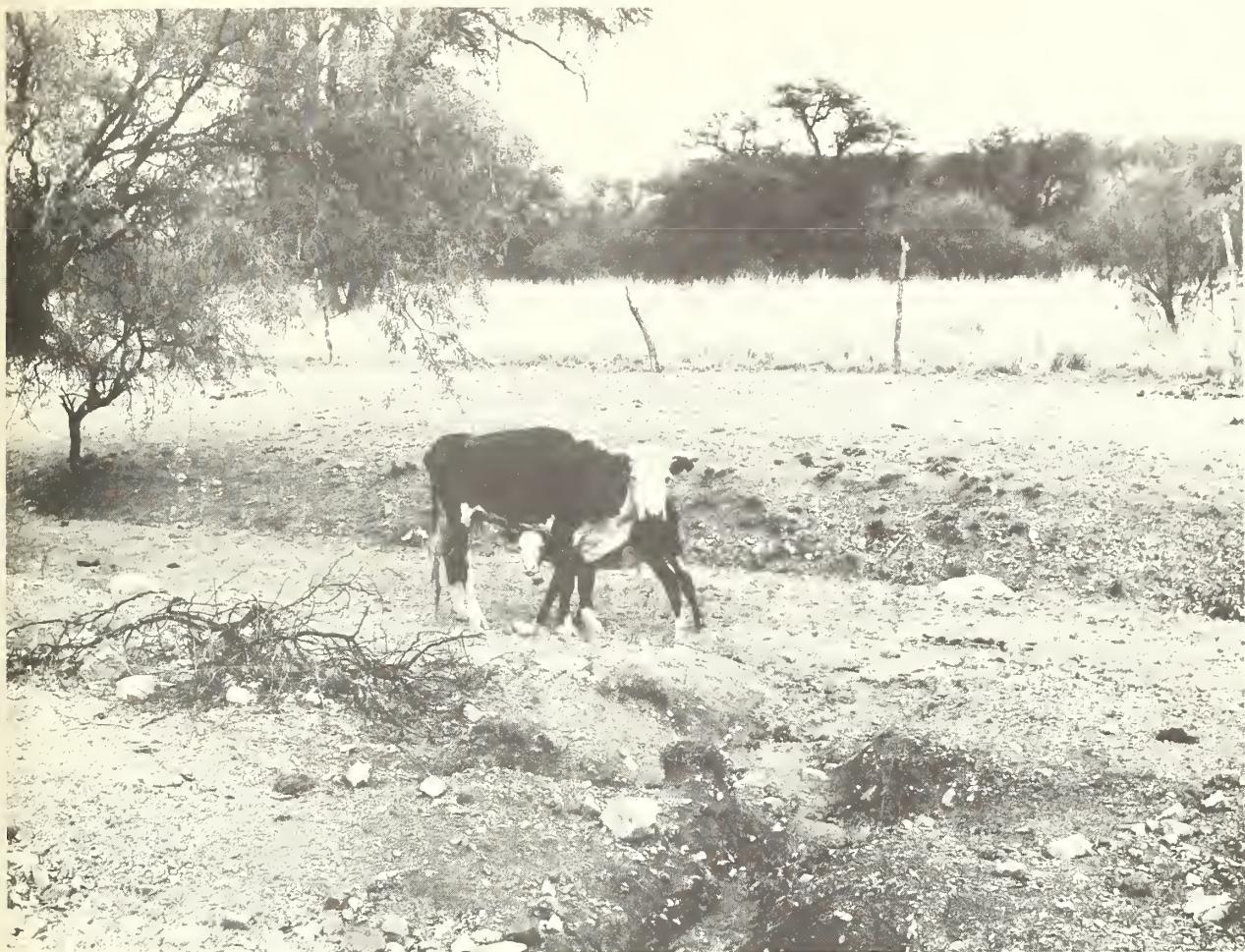


DOLLARS

Comparative production and net return from lambing on native range and on crested wheatgrass in northern New Mexico. All sheep grazed the same summer range. Return is based on a band of 654 ewes. All data are 3-year averages, 1957-59.

Figure 0-5





Arizona ranges are capable of producing excellent range forage. The area in the foreground is in an advanced stage of deterioration from improper grazing. The plant cover is gone, heavy soil losses occur, and the few animals that graze merely exist. The area behind the fence shows the forage production potential of those lands if they are properly managed.



Application of research findings on proper treatment and management show that forage production on forest ranges that have low capacity for timber production can be greatly increased. In this case, in the Ozarks, forage production has been increased from 30 pounds per acre before treatment (1959) to nearly 2-1/2 tons per acre in 1962. Treatment consisted of aerial spraying of blackjack-post oak and winged elm with 2, 4, 5-T, seeding to be K31 fescue-legume mixture and fertilizing.

Figure 0-6

(17) Wildlife habitat research \$595,000

No program increase is proposed for fiscal year 1965.

Wildlife habitat research is concerned with the development of management and improvement practices for supporting optimum populations of game and fish in harmony with production of timber, water, and livestock on forest and related rangelands. Management and improvement of wildlife habitat is complex as each kind of animal has specific habitat requirements that must be balanced against requirements for production of water, timber, and forage for livestock. Research involves studies of forage utilization and environmental factors on seedling establishment and survival. Special practices are developed for increasing food and cover for both big and small game by seeding, planting, burning, spraying, and fertilizing. As a basis for successful integration of wildlife, livestock, and timber production, the nature and degree of competition between wildlife and livestock are determined for various types of forest and rangelands, as well as effects of silvicultural and timber harvesting practices on food and cover plants and reciprocal effects of forage production and wildlife grazing on timber reproduction and growth. Research on fish habitat improvement includes studies of regulating shade and water temperatures through manipulation of streamside vegetation, creation of gravel spawning beds, and stabilization of channels.

Forest and related rangelands provide the main habitat for an estimated ten million big game animals as well as for countless numbers of other species of wildlife. These lands also contain over a hundred thousand miles of fishing streams and more than two million acres of lakes. Demands on these resources are continually increasing, and will have to be met in large measure by the public lands. But game, particularly small game, can be an important source of income for private ownerships, including the small farm woodland owner. In the Southeast, for example, it is not unusual to lease quail hunting privileges for one dollar per acre per year. A farmer with good bird dogs and good hunting can realize as much as \$50.00 for a party of two men per day. Information on ways and means to manage and increase habitat productivity for upland game is needed by small woodland owners as well as large forest industry landholders and public land administrators. The wildlife habitat research program involves active cooperation with Federal (particularly the Fish and Wildlife Service) and State fish and game agencies and educational institutions.

Although habitat conditions on some areas are suitable for supporting high wildlife and fish populations, the capacity of most forest and related rangelands can be greatly increased. Some of the low-producing areas are the result of damage from logging, fire, or overuse by livestock or big game, whereas others are due to the natural development of vegetation that is unproductive for wildlife. In some areas deterioration of the vegetation cover and accelerated soil erosion have resulted in unfavorable water temperatures, excessive stream siltation, unstable channels, and exposed banks. Consequently, many streams flowing through these lands are below their potential for fish production. In some western mountain streams dense shade from riparian vegetation maintains water temperatures too cold for trout.

In the West, emphasis is placed on studies concerned with rehabilitation of big-game winter ranges; integration of wildlife and timber production, competition and resolution of conflicts between big game and livestock, and habitat management to improve game distribution and allow efficient utilization of available forage and cover, and manipulating livestock range improvement practices such as sagebrush and juniper control to provide for food and cover plant needs of big and small game. In the South and Southeast, studies include the integration of deer and small game with timber and livestock production. In the Northeast and the Lake States major emphasis is on studies to improve habitat and reduce wildlife damage to northern hardwood species through modification of silvicultural practices. In the Central States studies are concerned mainly with small upland game habitat management and revegetation of forest openings with suitable food and cover plants. In the Appalachian States research will include management and habitat improvement for turkey, grouse, and deer. In the Northern Lake States, research will be undertaken on upland game habitat in the northern hardwoods and related swamp types. In the Missouri Ozarks, research will be focused on wildlife habitat evaluation, improvement and management of upland game and integration of wildlife and timber production. On National Forests and other public lands research will emphasize how best to improve habitat and at the same time to integrate wildlife use with use of the land for timber and livestock production.

Examples of Recent Accomplishments

Turkey populations increase sharply after forest habitat improvement. Wild turkey populations of the Broad Run area, Jefferson National Forest, Virginia, have responded spectacularly in a pilot test of habitat improvement utilizing several large management compartments. Beginning with 12 birds in the fall of 1957, the population had increased to more than 125 birds by 1963. Management included establishment of supplemental forage clearings planted to bluegrass and ladino clover, small impoundments for watering, and stepped-up timber cutting and stand improvement measures (Figure 0-7). Although there have been general increases in turkey numbers elsewhere, this local and substantial rise undoubtedly reflects favorable response to land management activity in the test area. Very heavy use of forage clearings by broods for insects and weed seeds, plus year-round clipping of greens probably have been major contributing factors. Forage clearings may also be beneficial to deer; but their real value has yet to be determined.

Browse seeding improves deer habitat. Research in California has developed methods for successfully seeding bitterbrush on deteriorated winter deer ranges. One acre well-stocked with seeded bitterbrush plants will provide forage for a 100-pound deer for as much as ten months. Browse seeding is no substitute for good deer habitat management, but it does provide another tool for game and land managers to use where needed. It is particularly useful following wildfire on deer range. On many burned or severely deteriorated ranges, important browse has little or no chance of coming back naturally. Seeding will materially hasten range recovery. (See Figure 0-7.)

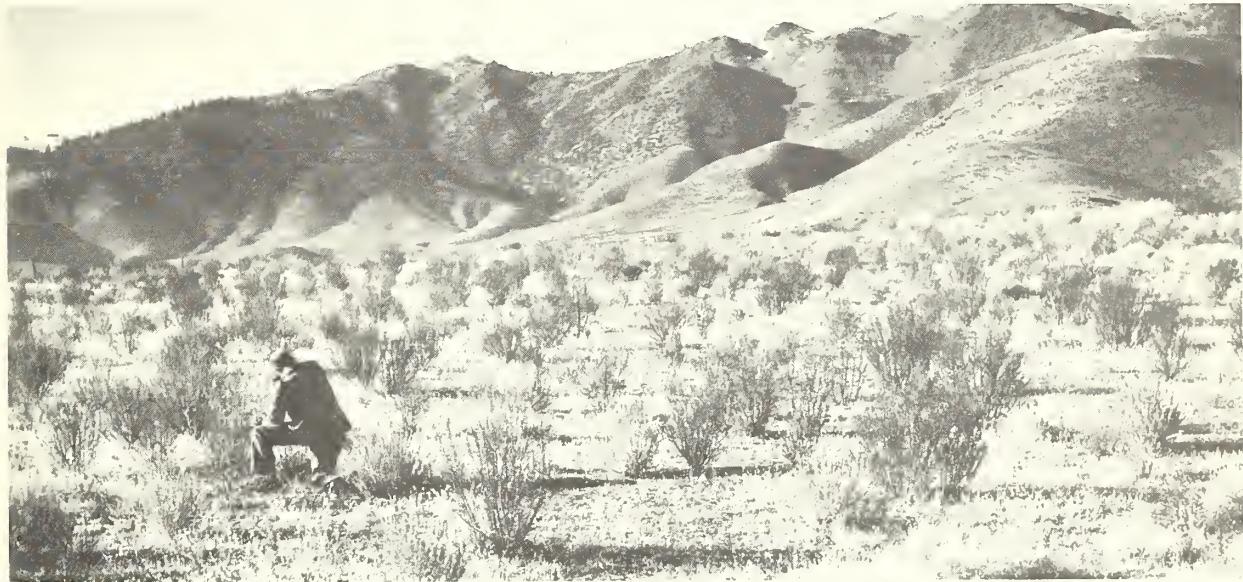
Thinning pines increases understory yields. Studies in eastern Washington and Oregon have shown that thinning dense stagnated stands of regenerating ponderosa pine results in big increases in understory vegetation. At the end

of the third growing season following tree removal, the thinned plots in addition to releasing trees for more rapid growth were producing 3 to 4 times as much herbage as the unthinned. Grasses and forbs each accounted for about half the total increase with shrubs contributing less than 10%. In future years, shrubs will provide a much larger proportion of the total yield. Increased forage for both game and livestock may be an important adjunct to timber stand improvement, and thinning dense pine stands solely for forage production may be justified on certain key areas.

Invading conifers cause deterioration of big game habitat. Studies of deer summer ranges in Utah show that invasion of aspen communities by conifers over widespread areas is reducing deer forage in this valuable wildlife habitat. As basal area of conifers increases in aspen stands, the amount of aspen, the volume of forage, and the intensity of deer use all decrease. Forage in aspen stands was eight times greater and deer use about seven times greater than on similar sites now dominated by conifers. On many areas where conifers are invading aspen stands, the sites are too poor to produce merchantable timber. Such areas might well be managed primarily for wildlife and other uses by altering the natural succession from aspen to conifers.



Direct habitat improvement by creating openings 1 to 5 acres in size, in Eastern hardwood forests, and establishing a permanent cover of food and cover plants is beneficial for turkey. The value of the openings for deer has yet to be determined, although hunter success and enjoyment is definitely enhanced.



Knowledge gained from research made possible the establishment of this good stand of bitterbrush by direct seeding on deteriorated winter deer range in northeastern California. Additional research is needed on adaptability of other browse species, site requirements and methods of planting.

Figure 0-7



(18) Forest recreation research \$421,000

No program increase is proposed for fiscal year 1965.

Forest recreation, once considered a minor use of the forest, has become a major use and has created many problems that cannot be solved quickly and efficiently without supporting studies that are soundly organized and carried out. In 1940, the National Forests received 16 million visits. Last year this number increased to 113 million. Millions more are visiting other public and privately owned forest recreation areas--and the upward trend will continue. This buildup must be fitted into increasing demands for water, timber products, wildlife, forage, and other forest resources. As part of the Department of Agriculture's program to aid farmers, especially in economically depressed rural areas, research hastens identification and evaluation of opportunities to develop income-producing recreation by the small woodland owners.

Forest recreation research is underway at 8 of the 10 Forest Experiment Stations. Current studies are pointed toward: (a) the management of the recreation site--to determine how campgrounds, picnic areas, and other developed areas receiving heavy use may best be planned and managed to prevent damage to soils and vegetation and be maintained without costly rehabilitation of worn-out sites; (b) to better understand the essential requirements for recreational habitat and developments of those who use the recreation sites; and (c) to identify and explore the economic opportunities for developing income-producing recreation enterprises on privately-owned (often farmer-owned) woodlands--with particular emphasis on economically depressed rural areas.

Further emphasis is needed to strengthen established projects of highest priority including: (a) studies of the demand for, and income opportunities from, fee-operated small woodland recreation enterprises in the Midwest, northern California, Northern Great Lakes, and Appalachian regions; (b) studies of forest recreation visitors' wants and needs, their attitudes in integrating recreation use with other forest uses and of ways to properly integrate these uses; (c) related studies of wilderness area visitors and use and essential management practices to preserve wilderness conditions; and (d) studies of forest recreation site soils and vegetation aimed at improving methods of selecting new sites for development, restoration of worn-out sites, and management of sites to prevent damage from heavy use.

Examples of Recent Accomplishments

Guide for picnic-area planning. A study of the use of picnic facilities in Pennsylvania showed that even under extremely crowded conditions, tables beyond 250 feet from a parking strip were seldom used. Tables beyond 400 feet were not used at all. Visitors would spread a blanket between two occupied tables rather than walk the distance to an empty table. Armed with such information, recreation planners can develop campground layouts more efficiently and recreational investments can be made on a sounder basis than heretofore (Figure 0-8).

Deterioration of campgrounds. A study of the vegetation and soils on heavily used forest recreation sites in California shows that the herbaceous and shrubby screening vegetation between campsites is usually depleted; that natural regeneration has had little opportunity to get started, and planted trees have seldom survived. However, spiny shrubs, such as mountain whitethorn, were found to be providing effective screening. Also tree seedlings are more easily established and sustained under the spiny shrubs. Research on methods of rehabilitating camp and picnic grounds will be continued until adequate guides are available for rehabilitating depleted campgrounds and for preventing unacceptable damage.

New ways to estimate recreation use. Reliable estimates of recreation use are needed as a guide in the planning and management of campgrounds and other forest recreation facilities and areas. An excellent means for obtaining such information was developed in the Southeast by relating number of visits and man-hours of use to traffic counts. Relatively simple statistical analysis techniques relating axle counts made by pneumatic traffic counters to type of recreation use--such as camping, picnicking, boating, or number of visitors, or party size--produced reliable estimates. A study on the White Mountain National Forest in New England showed that the number of registered campers in a few large campgrounds provided an estimate of the number of campers in small unsupervised areas and a measure within 4% of the true figure for total season use on all campgrounds on the forest. In a similar study in California, total use on a group of 24 campgrounds in the Sierra Nevada was estimated with satisfactory accuracy by measuring the use on only one. In fact, measuring the magnitude of campground use through indirect measures, such as metering the amount of water used at the recreation sites, were found to be 80% accurate. These devices are greatly facilitating the measurement of recreational use of forest campgrounds.

Savings made through use of aerial photo techniques. Lake depth, often expensive and difficult to measure in remote high mountain lakes, is a critical factor in planning for water-based recreational developments. Aerial photo interpretation techniques were developed in Utah which will measure the waters around lake perimeters to depths of 15 feet at one-tenth the cost of field soundings.

Need for recreational zoning. Lake zoning and speed rules have become necessary in several areas to lessen the conflict between fast motor-driven boats and fishermen and swimmers. An interview study in the Boundary Waters Canoe Area shows that canoeists are willing to tolerate other canoeists in large numbers in the same waters, but they object to motor boats. Even an occasional motor boat eliminates the enjoyment of a wilderness aspect for the canoeist.

Analysis of user fees. To provide background information relative to the development of a pattern for user fees, a further study was made of 1959 data acquired by the Outdoor Recreation Resources Review Commission on recreation charges. Low fee returns are typical--34% of the operators of charge areas recovered 1 to 19 cents per dollar of operation costs through fee incomes. An additional 24% recovered from 20 to 39 cents. Only 14%--or one out of seven--of the charge areas returned fees equal to or greater than the non-capital expenses involved.

Picnic Area Planning

A recent study of picnic area use patterns shows that picnickers seldom walk more than 250 feet to a picnic table. These photographs, taken on the same day in the same picnic ground, show crowded conditions that picnickers put up with rather than walk the extra distance to more remote vacant spaces. Information such as this is important for use in planning for new recreation facilities.



Figure 0-8

(19) Forest fire research \$1,848,000

No program increase is proposed for fiscal year 1965.

A major element in conserving and managing the natural resources of forest, brush and grasslands is to protect them from wild fire. In 1962 the cost of this effort nationally rose to \$140 million for 115,345 fires that burned 4,078,894 acres. Damages are estimated at \$100-\$300 million. In the last ten years, both numbers of fires and area burned have been reduced significantly, but the damage done each year has declined only slightly and suppression costs have risen sharply. The rapid increase in population and use of forest resources has greatly increased the size and complexity of the fire protection problem. Each year these resources become more vital to the public need so more adequate means of fire protection must be developed.

Research on forest fires is directed toward reducing fire losses, improving efficiency of fire prevention and control measures, and toward better techniques for using fire beneficially in forest and range management. Human attitude and behavior studies are laying the groundwork for improved fire prevention methods. Studies of thunderstorms and ways to reduce their fire-starting lightning discharges are continuing. How to predict fire behavior more reliably for better and safer fire fighting is being developed through intensive study of environmental factors that control the way fires burn. New chemicals and other additives to water that improve its fire fighting efficiency are being developed and tested. Also under study are fire effects and how to achieve best results from fire use for hazard reduction--including slash disposal, modification or control of vegetation, seed bed preparation and other purposes.

The frequency of wild fires in the southern States must be drastically reduced if the forest products industry is to continue to serve as a primary industrial base. Since 1956 the southern State conservation agencies have expended much effort toward stronger law enforcement and faster attack on fires, but the number of fires, the area burned, and the losses suffered have increased. In Alaska the State Forester is faced with taking over management of 100 million acres of forest land to be protected and managed by the State. To convert a skeleton system of protection developed by the Department of the Interior to a State system of protection of managed forests for the future is a bold and difficult undertaking. Conventional measures will not suffice. State officials and those charged with protecting hundreds of millions of acres of Federal lands need greatly advanced technology and improved guidelines for the careful planning necessary to the development of an extensive but practical system.

The forest fire research program is attacking problems of reducing the numbers of fires that start, in finding out how to organize every step of preparedness action most efficiently, and how to combat fires rapidly and successfully--especially those of conflagration potential. In fiscal year 1965 emphasis will be given to research aimed at the more troublesome high priority problems. An example of this is the lightning prevention project in the northern Rockies where results so far suggest lightning may be reduced 38% and therefore numbers of fires may be cut.

Fire fighters still cannot determine unerringly which of several small fires starting about the same time is going to develop into a major conflagration because of lack of fire behavior knowledge. Fuel-weather-topography studies will attempt to categorize the extremely dangerous combinations of conditions. Studies of thermal energy relations produced by fires, winds, and mountain slopes will be directed toward a better understanding of mass fire behavior. The relation of man, who starts 90% of our fires, to the whole fire control problem will be examined with the hope that new ways may be found to successfully break careless, thoughtless, or deliberate actions that lead to serious resource damage, loss of life, and heavy fire suppression costs.

In both the East and West, various fire retardants developed by research have been pressed into service in aerial attack by Federal and State agencies. The potential of aerial attack to limit aggressive fires to small size in otherwise inaccessible areas has proved increasingly valid, and the method is being extended rapidly. However, aerial attack is potentially a costly and dangerous method unless skillfully planned and applied. To provide the most effective retardant for the purpose, to adapt it to both aerial and ground applications, and to supply adequate guidelines for skillful use, requires a more aggressive research program to again bring research findings in advance of practice.

Examples of Recent Accomplishments

Weather and topography. Firefighters and fire weather forecasters have urgent need for more precise techniques by which to judge the complex local weather variations in rugged mountainous terrain. Research is gradually meeting this need through aerial data gathering and new analysis techniques. For example, observations with an aerograph mounted on a light airplane have shown striking differences between temperature and humidity observed over the Salem, Oregon radiosonde station and over the adjacent mountain ranges. The reasons for these differences are not apparent until the observations are analyzed in terms of their sea-level equivalents. Then it becomes easier to trace air flow and meaningful patterns evolve. In one case-study of a hot spell over western Oregon, the sea-level temperature pattern not only identified the country affected by each air stratum, but also showed that warming began in the high country first, then progressed downward to the lower elevations. Advection of cool air up canyons and through the mountain passes was clearly shown. Perhaps the most significant finding has been that observations of relative humidity and temperature at surface stations at different elevations in mountain terrain need first to be interpreted in terms of sea-level equivalents before they become meaningful to the fire weather forecaster and the fire behavior specialist. This is an important first step in unravelling the secrets of seemingly erratic variations in mountain weather.

Fire mapping. Tests of an airborne infrared scanning system have shown it capable of mapping forest fires. It enables the observer to see through dense smoke that precludes visual mapping and it operates equally well both day and night. It quickly reveals not only the fire perimeter but the spot fires and hotly-burning spots that threaten breakouts on the fire front.

Tests on major fires in 1963 proved its effectiveness. Fire bosses were delivered accurate pictures of the fire and its rate of advance in minutes, even though heavy smoke or darkness obscured the blazes. Forest fire control agencies are already much interested in the practical value of this new capability in the planning and execution of fire fighting operations on large fires. The system was placed in full pilot operation for this purpose in Western Regions in late summer of 1963.

Fire detection. Research is developing an instrument to enable immediate detection and location of lightning strikes, responsible for about 10,000 fires a year in Western forests. The principal problem here has been to design an efficient direction-finding antenna sensitive to electro-magnetic signals from lightning discharges. Another hoped-for design feature is that the antennae respond only to cloud-to-ground discharges or, at least, identify them. An antenna has been fabricated that performs satisfactorily under laboratory test, and is now ready for field trial. In practice, two antennae and receivers on a surveyed base line are required to locate a strike precisely by triangulation. The system will be especially valuable in the great expanses of Alaska and in other areas where large numbers of detection towers cannot be efficiently maintained and operated.

Use of fire to remove highly flammable chaparral. Controlled fire can now be considered a useful device for creating firebreaks and other desired openings in large areas of chaparral in Arizona and other parts of the Southwest. Studies have shown how chaparral can be removed without undue risk and at reasonable costs by dehydrating strips of chaparral with chemicals so they will burn when untreated brush will not. Strips 50 to 200 feet wide have been successfully burned this way with little or no tendency for the fire to spread out of bounds.

Particularly in chaparral, a single burn treatment is not satisfactory by itself as a fire protection measure. Chaparral is a fire type and quickly reclaims the site following any fire. Recent research has found this can be prevented through use of herbicides to control sprouts and seedlings on burned areas. Use of this technique has been made in breaking up large southern California chaparral areas into smaller blocks by removing the vegetation in strategic areas and replacing it with grass or other low-growing vegetation. Following the guidelines established by research, about 14,000 acres of these fuelbreaks have been established in that area. This form of type conversion is especially useful in the rehabilitation of areas burned by wildfire.

Operations research. Operations research techniques have been highly successful in solving many diverse problems in science and industry. We are now starting to use the same techniques in solving fire control problems. For example, one investigation of large fire management has shown that current crew feeding practices can be revised to permit more flexibility and mobility to fire fighting personnel. The same study has shown that adequate communication on large fires will require solution of the critical problem of information flow and interaction found in emergency situations.

One completed study has devised an optimal search procedure for a fire lookout observer scanning an area for fires. These results are being used in an expanded study to determine the best distribution of detection stations and procedures for a multiple lookout network.

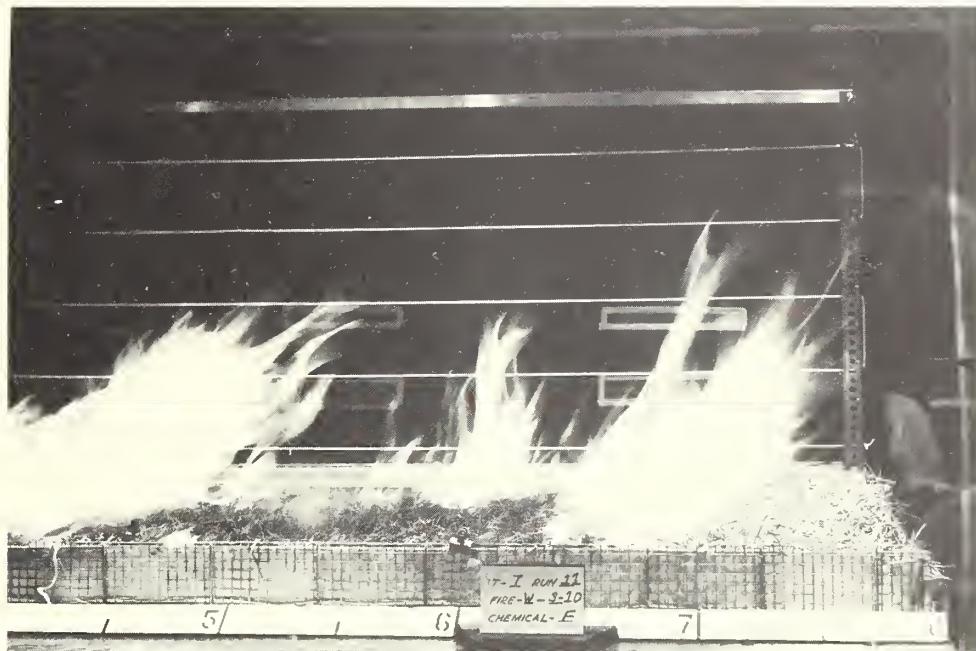
New forest fire fighting chemicals. A new viscous solution of Diammonium Phosphate has shown superiority as a fire retardant in the laboratory. It drastically reduced the rate of spread and intensity of small pine needle fires both with and without wind, and had lost very little effectiveness when the fuel bed was allowed to dry for three hours after it was applied.

New laboratory facilities are making it possible to obtain reliable information of this kind in a short time. With wind, temperature, humidity and moisture content of the fuels carefully controlled it was possible to compare the effectiveness of seven fire retardant chemicals in these respects in a one-month program. Field tests to check on other factors are now being carried out. Many times this number of fires and several years of work would have been necessary to obtain the same information through field tests alone. (See Figure P-1.)

Fire Fighting Chemicals



Aerial application of fire retardants has proven to be a highly efficient and economical method of fire control.



Here a model fire in pine needles under controlled conditions is being used to test the effectiveness of various fire retardants. Laboratories in which model fires can be created under specific burning conditions are greatly facilitating fire research. Many small scale tests can be made with precise control. Costs are relatively low and much information can be obtained in a shorter period of time than would be possible with outdoor, uncontrolled fires.

Figure P-1

(20) Forest insect research \$2,241,000

An increase of \$200,000 would be used to intensify the search for pest control methods that will reduce the hazards at present associated with chemical control. All phases of indirect biological approaches will be strengthened including studies of parasites, predators, and pathogens of western and southern barkbeetles and eastern and western defoliators; use of systemic materials or improved chemical formulations to substitute for more hazardous methods; and research on the biology and ecology of insects so that their behavior in relation to silvicultural control may be understood and applied broadly in timber cutting operations.

Research on forest insects is directed toward the prevention or control of destructive insect attack on forests and forest products. Damage by insects enters into all phases of forest management from the seed to the mature forest. The development of effective and economical methods of direct and indirect control is dependent upon thorough knowledge of life histories and habits of forest insects, including the interrelationships between the insects and their environments. Control of forest insects by indirect methods such as the use of natural or introduced predators and diseases of insects, by silvicultural practices designed to prevent the buildup of insect epidemics, and by radiation and chemosterilization techniques, offers promise and is being given major emphasis in the research program. Investigations on direct control methods involve mechanical and chemical methods, including development of safer chemical controls.

Insect research is concerned with the development of safe, effective, and economical methods of preventing or controlling destructive infestations of forest and shade tree insects, and insects affecting browse plants on forest-related ranges. Included among these insects are those that kill trees outright, such as the barkbeetles that cause heavy losses in the West and South. Included also are (a) a wide variety of species that feed on the foliage of trees and either kill them outright or reduce their vigor and growth; (b) insects that damage or destroy the flowers, seeds, and cones of trees; (c) borers that tunnel into the wood and reduce its value through degrade; (d) borers that damage or destroy valuable forest products, such as logs, lumber, and pulpwood; and (e) various insects that damage or destroy young trees in forest plantations. No part of the country is immune to the ravages of these insects, and no year passes without one or more of them occurring in the form of outbreaks.

During an average year insects kill enough commercial sawtimber to build some 600,000 average-size homes; during periods of outbreak, which occur at frequent but unpredictable intervals, these losses are much more severe, often bordering on the catastrophic. In addition, insects kill a billion cubic feet of timber below sawtimber size and cause a growth loss of three-quarters of a billion cubic feet each year. Forest insect outbreaks also result in increased fire danger and often set the stage for destructive fires which impair valuable watersheds and wildlife habitats. They jeopardize the success of seed orchards and tree-planting programs; they destroy enormous volumes of forest products, such as logs, lumber, and pulpwood; and they reduce the carrying capacities of forest-related ranges for livestock and big game. Insect-caused losses such as these show no

signs of decreasing. Instead they seem to be increasing in severity year-by-year. Public demands for relief from them are becoming increasingly insistent.

The program for fiscal year 1965 will deal with research on the causes of outbreaks of some of the most destructive forest insect pests as a basis for developing safer, cheaper, and longer-lasting methods of preventive control. In this connection special emphasis will be placed on studies of biological control factors, such as insect parasites, predators, and disease pathogens. Increased emphasis will likewise be placed on (a) studies of other environmental factors affecting insect populations, such as stand age, condition, and density; (b) on determining factors of tree resistance to insects as a basis for developing resistant strains or hybrids for use in planting programs; and (c) on exploring possibilities of control through the use of chemosterilants, and gamma irradiation, and attractants and repellents, and for the development through genetic manipulation of more effective strains of insect parasites and predators. Studies in chemical control will be strengthened, with emphasis on determining modes of action of chemicals on and in both insect pests and their host trees, as a basis for developing (a) safer and more selective materials and formulations, and (b) safer and more effective means of application.

Examples of Recent Accomplishments

Factors of resistance in pines to bark beetle attack. Recent studies indicate that the resistance of certain pines to bark beetle attack may be determined to a large degree by the presence and abundance of certain constituents of resin. Analysis has shown that between 20 and 35% of these constituents are volatile and that most of them are terpenes. The principal terpenes of ponderosa pine were found to differ considerably in their toxicity to the western pine beetle. A terpene called "limonene" was found to be most toxic to the principal insect enemy of ponderosa pine. This information will be used in the forest genetics program aimed at developing insect resistant trees for planting programs.

Nematodes parasitic on fir engraver beetle. Two important species of parasitic nematodes have been discovered on the fir engraver beetle, a serious pest of white fir in western United States. Female beetles infested with the nematodes lay no eggs, and infested male beetles are sterile. Although infested beetles are unable to produce eggs or sperm they do carry the nematodes with them when they emerge and fly to new host trees. This tends to disperse the nematodes from tree to tree. Studies in 1962 indicated that an outbreak of the fir engraver beetle on the Lincoln National Forest, New Mexico, was controlled by these nematodes. The fir engraver beetle does great damage to white fir, often before outward signs of an infestation are evident. Chemical controls are not feasible but a biological control, such as by nematodes, would be of significant help in combating the insect pest. Other species of bark beetles are also affected by nematodes which in most cases operate to reduce the reproductive capacity of the insects substantially. (See Figure P-3.)

Lindane-diesel oil spray controls mountain pine beetle in lodgepole pine.

During recent studies in California, mountain pine beetle broods beneath the bark of lodgepole pine were controlled satisfactorily by application of a 1.5% lindane-diesel oil spray to the bark of infested trees in June. This was accomplished at an average cost of \$4.81 per tree--about half what it would have cost using bark-penetrating sprays. The mountain pine beetle is widespread and control has been costly. Lowered costs will result in virtually doubling effectiveness of control programs.

Life history of the round-headed pine beetle. Prior to last year the life cycle of the round-headed pine beetle, a destructive pest of second-growth ponderosa pine in the Southwest, was unknown, thus making it impossible to know when during the year to apply control measures to the best advantage. It has now been determined that the beetle has a one-year life cycle. Eggs are laid during October, and the winter is passed either in the egg stage or as young larvae. Activity resumes the following spring and many larvae are mature by mid-June. Pupation begins around mid-July. By late September most of the brood have reached the adult stage and are ready to start the life cycle all over again. These results show that control measures should be applied in late summer and before the end of September to obtain greatest beneficial results.

Control of an important insect pest of Douglas-fir seed. In northern California, a destructive pest of Douglas-fir seed is the Douglas-fir cone midge. By destroying seed, the insect threatens quick natural reestablishment of a forest after cutting. Collection of sound seed for tree nurseries is made more costly. The insect lays its eggs within conelets during a brief period in the spring when the cone scales are open to receive pollen; and after the eggs hatch the young larvae destroy some seeds directly and cause others to stick to the cone scales. Living as they do within the cones, these larvae are difficult to kill with sprays. Once the larvae are full-grown, however, they leave the cones and move to the duff on the ground where they pupate. After pupation is over the adults must crawl up through the duff before they can take flight. In recent laboratory research it has been demonstrated that almost complete kill of these adults can be obtained by spraying the duff with lindane at the rate of 1.5 pounds of the toxicant in 15 gallons of oil per acre.

Biological control of the larch casebearer in Idaho. In 1957 the larch casebearer, an insect of European origin, was discovered for the first time in western larch stands in Idaho. Previously, it had been found only in stands of eastern larch in eastern United States and Canada. So far, practically no native parasites have been found attacking the casebearer in Idaho. In 1960, colonies of a species of parasite were collected in eastern United States and shipped to Idaho where they were liberated in infested stands. Last year the parasite was recovered, showing that it had completed at least two generations in Idaho. Further studies are needed to determine its control effectiveness but the outlook for biological control is promising. In many localized areas in the East where this parasite was introduced from Europe several years ago, it is exerting a high degree of control of the casebearer.

Project (20)

Effect of chemosterilant on the locust borer. In recent laboratory studies female locust borers were completely sterilized by feeding them on a 1% solution of the chemosterilant metepa. About one-half of the eggs laid by females fed on a 0.1% solution were also infertile. Further research is needed to determine the possibilities of using this material to control populations of the locust borer.

Parasitic mites attack southern pine beetle. Recent studies in southeast Texas have demonstrated that eggs, larvae, and pupae of the southern pine beetle are frequently attacked and killed by the nymphs and adults of an acarid mite of the genus Thyreophagus. These mites feed voraciously on the beetle, devouring all but the head capsules of larvae or other sclerotized parts. Another mite of the genus Pendiculoides has also been found attacking this bark beetle. During 1962 mite populations were heavy in bark beetle outbreak areas in Texas and are believed to have contributed materially to the collapse of these outbreaks by the end of the year. The next step of research will be to find ways to put these mites to work on a planned basis in checking outbreaks of this troublesome beetle which has killed millions of board feet of southern pine timber each year in the past decade.

Atomization of airplane sprays. According to recent research, the most important factors affecting atomization of airplane sprays are air speed and the direction of spray nozzle orifices. With large spray nozzles, such as are commonly used on large planes in forest spraying, the size of spray drops are reduced 60% when air speed was increased from 80 to 200 mph. Smallest drops were obtained by directing nozzle orifices forward and down 20° in relation to the thrust line of the plane. This information will enable aerial spray programs to be designed to use the minimum of chemical sprays and achieve the greatest degree of efficiency.

Silvicultural Control of the Red Oak Borer

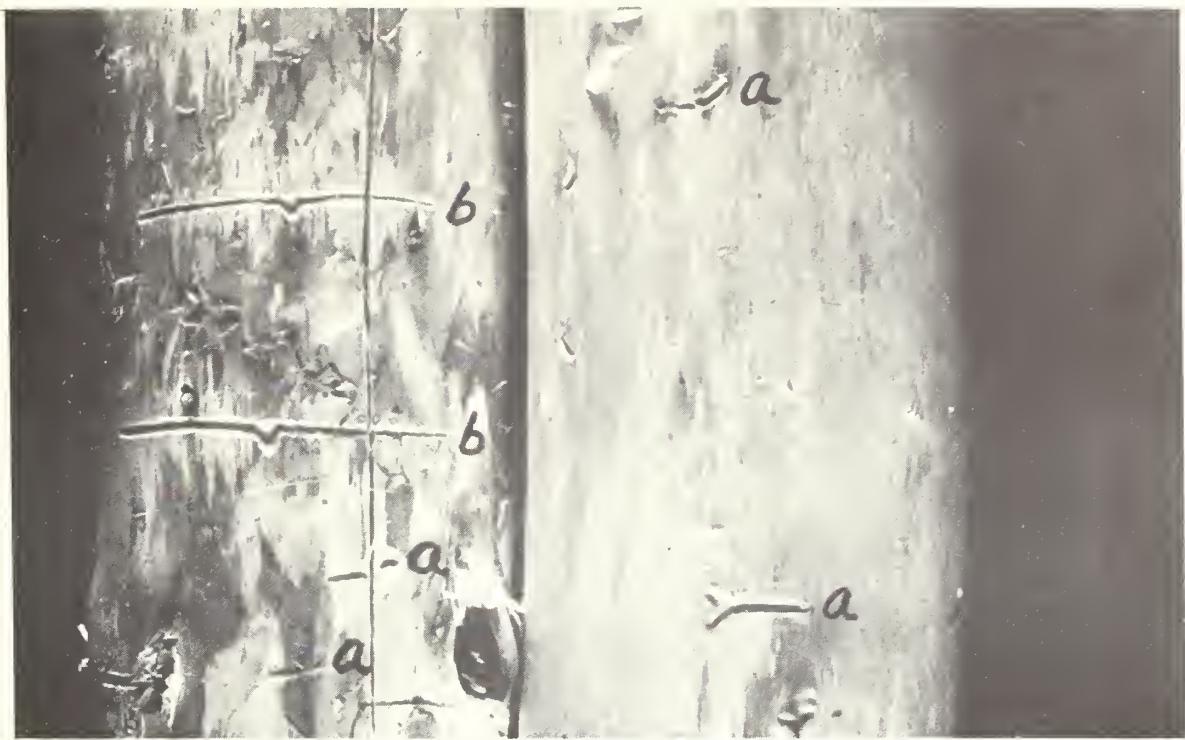
Recent research in the Central States has shown that populations of the red oak borer, a destructive pest of upland oaks in the region, are heaviest in slow-growing, small diameter trees in a stand. Removal of these trees during the period when they are harboring infestations of the borer reduces borer populations in the stands to low levels and thereby lessens the danger of damage to the more valuable larger trees.



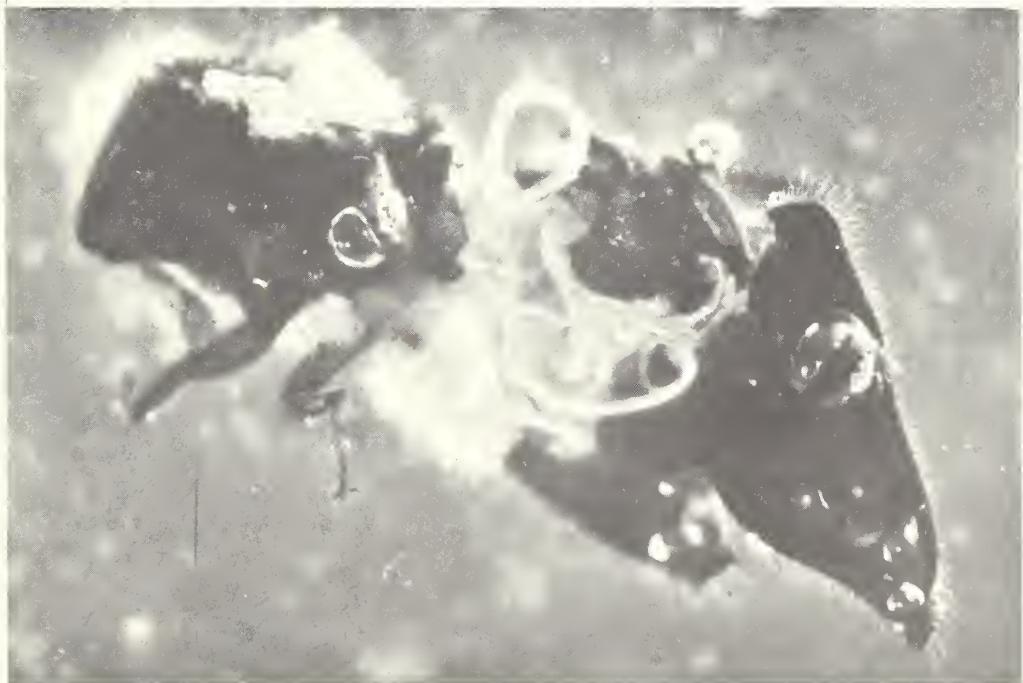
Red oak borer (inset) and an illustration of the damage it causes as it tunnels into the wood of living trees.

Figure P-2





Egg galleries made by the fir engraver beetle. (a) Short galleries made by beetles infested with nematodes and (b) long galleries made by beetles not infested with nematodes. Free living nematodes are deposited in the short galleries before death of the beetles. The short galleries do much less damage to the tree than the long ones.



An Ips bark beetle infested with nematodes.

(21) Forest disease research \$1,767,000

An increase of \$41,000 would be used to strengthen research on the serious diseases that are doing extensive damage in young natural stands and plantations, and to valuable natural hardwood forests. In the West the work would emphasize study of soil microbiology with the aim of developing the basis for biological rather than chemical control. Particular attention would be given to exploring new leads for using naturally occurring antagonistic fungi found where root rots are common. Elsewhere the emphasis would be on finding more effective controls for diseases that damage high-value hardwoods by determining the biological stage in the development of fungi that may make them vulnerable to effective control through biological or indirect silvicultural methods.

Research on diseases in forests, forest tree nurseries, and on decays and stains of forest products provides the basic information on the causes of diseases and on practicable and effective methods of combating them. Studies are underway on the identification and life history of the pathogens that cause disease, on the environmental conditions that result in disease epidemics in forests, on direct control by chemical and mechanical methods, on indirect control through silvicultural practices and genetic resistance, and on the improvement of disease survey techniques. In the products field, research is directed to the determination of methods of handling logs and lumber to prevent fungus infection; of the proper use of naturally durable or treated wood in high-hazard locations; and of improved structural design to reduce decay of wood in service.

Forest disease research develops the scientific knowledge on which the control of a wide variety of pathogens rests. Detailed knowledge of tree diseases, their preferred hosts and favored environments, permits several sound approaches to control; development of cultural practices favorable to forest trees but unfavorable to disease; selection and breeding amongst the hosts for genetic resistance; recognition of potentially dangerous foreign pathogens that they may be excluded by effective quarantines thus avoiding another disaster or costly control program such as the chestnut blight or white pine blister rust; and direct preventive or curative treatments. Emphasis is placed on cultural practices that can be incorporated at minimum cost into daily stand management practices, but all approaches are explored where appropriate. For example, research has shown that prevention of fire, reduction of logging wounds, and lowered ages at which timber is harvested will drastically reduce losses from heart rots, the number one disease problem; that *ribes* eradication will control white pine blister rust, and more recently that proper recognition of climatic influences will drastically reduce the needed control area in the Lake States and in California; biologic and economic studies show where thinning and pruning for dwarfmistletoe control can best be combined with other timber stand improvement measures to improve future yields; good progress has been made in selecting and breeding for genetic resistance to white pine blister rust, fusiform rust, and chestnut blight; and direct application of chemicals has tremendously reduced losses in forest tree nurseries.

Project (21)

In spite of substantial progress in lessening the impact of diseases on forests, we still lose billions of board feet of timber each year to an array of organisms such as bacteria, fungi, viruses, nematodes, and even flowering plants. In some situations, we are committed to long-continuing high annual disease control expenditures, such as for white pine blister rust, until better methods are found. Intensive forestry, now gaining in the South and West especially, is continuously harassed with disease problems. Soil-borne diseases and related root rots are presently less understood than any other category of forest tree diseases. Yet, the upsurge in reforestation and afforestation, often by planting a single species over extensive areas, is intensifying these and other plantation diseases.

The program for 1965 will emphasize the search for sounder and more effective controls of forest tree diseases based on better knowledge of the organisms and how they are affected by various environments, how antibiotics suppress fungus infections in trees, and how soil organisms interrelate and operate to cause root rots. Work will continue on developing an understanding and control of heartrots, vascular diseases such as oak wilt, rusts, leaf-destroying fungi, and the dwarfmistletoes of western conifers. Research on preventing decay to wood used in structures also will be emphasized.

Examples of Recent Accomplishments

Economic dwarfmistletoe control guidelines established. Silvicultural control of dwarfmistletoes is biologically sound but not necessarily economical and practicable except under favorable conditions. Research is now underway to more precisely define these conditions, but we already know that treatment of young stands of trees is economically profitable. Research has shown that control can be obtained at low cost by combining dwarfmistletoe sanitation with other operations--especially pruning and thinning in more lightly infected young stands on the better sites. On innumerable small to large areas, aggregating over 100,000 acres in the Pacific Northwest alone, relative small expenditures for control during the next few years will increase yields in the next rotation and reduce the size of the control job that must eventually be done. Practical guidelines as to how, where, and when to proceed are now available.

Selective medium for isolation of *Fomes annosus*. *Fomes annosus* root rot has recently become a serious economic threat to pine plantations in this country. Control measures are urgently needed, but before this objective can be attained research must determine just how the fungus originally enters a healthy stand and how it spreads thereafter from tree to tree. Answers to these questions depend on the researchers' ability to trace the movement of the fungus in infected trees. In the past this has been difficult, if not impossible, to do with accuracy; other fungi and bacteria in decaying wood quickly outgrew and obscured *Fomes annosus* when standard methods of culturing were used.

This problem has been overcome since pathologists have developed a culture medium, composed of several chemicals and antibiotics, which allows F. annosus to grow normally while greatly inhibiting the growth of other organisms. Researchers can now determine with a high degree of accuracy if the fungus is present and exactly how far it has spread. Answers to the questions of initial infection and subsequent spread now seem within reach, and the ultimate goal of an effective control for annosus root rot is much more probable now that this tool is available.

Pole blight not an epidemic threat to western white pine. The backbone for the timber economy of the Inland Empire is western white pine, a species that has been beset in recent years by a disease called "pole blight." Beginning in 1917 and lasting through 1940, the commercial range of this species was subjected to the most severe and prolonged drought that has occurred for at least three centuries. This has recently been determined by correlating tree ring analyses with weather records for the more recent years for which such records are available.

The climatic evaluation along with results of other research over the past 20 years shows that pole blight is a disease induced by the environment. Over the 100,000 acres on which pole blight is a problem, the soils are characteristically shallow and are low in both available moisture storage capacity and moisture recharge potential. The root system of white pine makes this tree more sensitive to soil moisture stress than any of the other tree species with which it grows in natural association. Only western white pine trees are affected by pole blight. No known pathogenic organisms cause the disease. Furthermore, there has been no significant spread or intensification for the past 10 years; some lightly affected trees are, in fact, showing evidences of recovery. Pole blight does not, therefore, appear to be a pathogenic threat to western white pine and investments for intensive management can be made with greater confidence in future profitability.

Microclimate influences rust control programs. Recent discoveries on the role of weather in the spread of blister rust to eastern white pine have brought about significant changes in control programs in the Lake States. This new knowledge has proved it biologically sound to terminate or reduce control activities in the warmer parts of the region where infection chances are not great. It also makes possible increasing use of white pine, one of the species favored by foresters for reforestation planting, now that previous fears of blister rust damage have been shown to be unfounded in these warmer regions. Conversely, it has indicated the need for more intensive control in the cooler parts of the region. Elimination of unnecessary control efforts in the southern part of the region has released an estimated \$150,000 for use in the northern Lake States where intensified control work is sorely needed.

Using colored smoke grenades and other techniques, rust hazards can be more and more specifically defined and management areas pinpointed as to comparative rust control needs. (See Figure P-4.)



Figure P-4

A colored smoke grenade was used to obtain this photograph demonstrating the type of airflow that may carry the minute blister rust spores from ribes in swamps to infect white pines on ribes-free hillsides as far as half a mile away. It also clearly shows why white pines growing on swamp margins much closer to ribes may remain rust-free; the infective spores are carried up and away from them.

(22) Forest products utilization research \$5,069,000

No program increase is proposed for fiscal year 1965.

The aim of the forest products research program centered at the Forest Products Laboratory and with field projects at the various regional Forest and Range Experiment Stations is to contribute to the solution of national, regional, and local utilization problems of all types, especially to problems of rural area development that often are related to improved utilization of the timber resource; to reduce unused woods and mill residues to a minimum by finding uses for present residues; to develop new products; and to improve the serviceability and lower the costs of existing products. Its broad aim, in brief, is to develop new utilization outlets for thinnings, unpopular and little-used species of timber, logging and milling residues, and to make the whole timber crop on farms and other forest lands go further and give better service in a wide variety of uses for lumber, paper, chemicals, and other products derived from wood.

The timber-using industry is an important part of our present economy. In 1959 the total value of shipments from timber-based primary manufacturing industries amounted to over \$10 billion. About 5% of the Gross National Product originated in timber-based industries. One out of every 20 people employed in the United States worked in these industries. A raw material base for a greatly expanded industry is available in little-used species, in low-value timber, and in logging and milling residues. Research in forest products utilization is needed not only to give stability to the present industry but also to develop a technical basis for new industries.

The Federal Government has a strong interest and responsibility in forest products utilization research. The industry in general is a complex of many small companies. Even the largest are small in comparison to those of other basic industries with whom they compete, i.e., aluminum, steel, plastics, and petroleum. One single large petroleum-using company employs more researchers than the entire timber-using industry. There are very few forest products companies who can finance a research program. Those that do are largely interested in product developments which will give them a competitive advantage; they pay little attention to finding uses for the poorer species and sizes of trees often in abundance.

The future of forestry in the United States will be jeopardized unless profitable use can be made of all of the forest crop. The problem is especially acute on the considerable acreage of timber in small ownership. Here the continued "creaming off" of the better timber has resulted in a residual stand of low value under present use standards. Research is needed to develop uses for this presently unmarketable timber. Many of the areas currently experiencing severe economic distress must look to full and effective use of their timber resources as the primary means for permanent improvement of their economic situation. The Federal Government itself markets over \$150 million worth of timber each year. The value of this timber can be greatly enhanced by the development of more profitable uses. Also proper forest management will be facilitated by developing markets for thinnings and other low-value timber.

Project (22)

The 1965 program will support basic and applied research in forest products utilization, aimed at furthering intelligent and profitable use of the timber crop. The work involves the development of new and improved processes and uses, the improvement in the serviceability of wood in use, and characterization of timber and timber products for specific end uses. Attention will be focused on the problems of developing new and improved industries for areas now experiencing economic distress. Emphasis will be given to the utilization of hardwoods which are abundant in most of these depressed rural areas. More attention will be given to applied and developmental research which would result in the early establishment of new industries.

Examples of Recent Accomplishments

Polaris missile. Wood is now being used to form the nose cone of the new Polaris missile. This is a result of research done by the Forest Products Laboratory working in collaboration with the Naval Research Laboratory. Design and fabrication procedures were quickly worked out since basic information on charring rate of wood and on glues to withstand high temperature were already available. Also factors for the design of shells composed of wood veneers were already developed. This accomplishment is highly important since materials previously used for this purpose, such as titanium and beryllium failed frequently due to propagation of cracks due to vibrational forces to which the nose cone is subjected in flight. Wood not only is the best material from a performance standpoint but is also much lower in cost than metals previously used. (See Figure Q-1.)

Marine piling. Research on the protection of wood piling exposed to attack by teredo and limnoria marine borers definitely shows the value of pretreatment with a copper salt before creosoting. This is an important discovery since wood has been losing out in this high-value use. Research will be continued to determine the most effective and economical method for applying the copper salts.

Forced air drying of lumber. Experiments on forced air drying of lumber at lower temperatures than are normally used in kiln drying have shown so much promise that kiln manufacturers are developing instrumentation and equipment especially suited for this use. Research is being continued to develop a rational basis for design of such dryers under various conditions of climate and for various species of timber.

Manufactured homes from wood. The stressed-skin type of construction for homes, originally developed by the Forest Products Laboratory and designed for the use of wood, has now become adapted to other materials such as metals and plastics. It is evident that competition will become more acute with time. Consequently, improved glues to develop better and faster fabrication of wood products are needed to help maintain a demand for wood products in this field. Last year, after 25 years of use and exposure to the weather, panels were removed from the original prototype prefabricated house at the Forest Products Laboratory. These panels were subjected to stress

and were found to be substantially as strong as when they were first fabricated 25 years ago. This should renew confidence in the use of glued wood structures. Recently two new glues have been developed for wood by the chemical industry which show promise of filling a need for a fast-setting, durable glue for wood assembly. Research is underway to determine the life expectancy of these glues, and panels fabricated with them have replaced the 25-year-old panels removed from test in the prototype house.

Solar heated lumber dryers. Solar energy is being used in a new approach to heating lumber dryers. Experiments with solar-heated dryers have demonstrated that the drying time for lumber can be reduced to about one-half that of air drying and the quality is better. In 1962, these results were used by a custom dryer of lumber for furniture manufacturers in Grand Rapids, Michigan, to establish the first commercial solar dryer. A semi-commercial experimental solar dryer was built by the Rocky Mountain Forest and Range Experiment Station at Fort Collins, Colorado, in cooperation with Colorado State University for trials under Rocky Mountain area conditions. Another experimental unit is planned in Georgia. Success of Forest Products Laboratory experimental designs at Madison, Wisconsin, and in Puerto Rico has also prompted construction of a solar dryer at the Japanese Forest Experiment Station in Tokyo. Other nations have shown interest. Solar dryers are inexpensive consisting basically of a simple frame structure enclosed by two successive sheets of tightly stretched, tough, clear plastics in storm window fashion. Interior wood parts of the dryer are painted a dull black to better absorb solar radiation. Circulation of air is provided by a series of fans, controlled by a photoelectric cell. Moisture is exhausted through vents regulated by a wood-element hygostat. In operation the structure serves as a heat trap. The forced-air circulation and moisture-venting system provides for controlling the rate of drying.

Package cushioning design handbook. The manuscript for a handbook on package cushioning design, the outgrowth of years of research in this field, was completed and supplied to the Air Force Packaging Laboratory, Brookley Air Force Base, Alabama. When published, this document will provide the Department of Defense and other government agencies as well as industry with means of applying sound, economical engineering principles to problems of cushioning for a wide range of machinery, equipment, and instruments in need of such protection during transit. Also completed was a Cushioning Selection Indicator. The indicator is based upon results of evaluations of many cushioning materials and provides a means for quick determination of cushioning needs in packaging.

Aspen pallets. An efficient design for a sturdy pallet made of lightweight aspen wood was developed and immediately aroused commercial interest in areas where this species is plentiful, notably the Lake States and the central Rocky Mountains. To compensate for its light weight, boards of this species are used in full inch thickness rather than the 3/4 inch to which such lumber is normally cut and dressed. Improved nailing was also

Project (22)

used. Tests showed that modified pallets made of aspen resisted twice as much rough handling and exhibited much less corner-impact deformation than pallets made from denser woods, such as oak. As a result of this work an increase in aspen utilization in the Lake States was noted and in Colorado aspen pallets were being proposed as the basis for a new industry.

Prestressed laminated wood beams. A new concept for prestressing glued laminated wood beams with steel wire cables received preliminary evaluation and was considered to offer promise of eventually increasing allowable loads by substantial margins. Limited studies showed that beams so prestressed can carry larger loads than matching control beams not prestressed, and that a more reliable prediction of ultimate load can be made for a prestressed beam. The data indicated that greater increases in strength resulted from use of the reinforcing steel strands in the lower structural grades of beams. The prestressing was accomplished by applying a tension force to the steel strands inserted in prepared holes in the tension portion of the beam. This induced bow in the beam, in effect putting under compressive stress the portion of the beam that in service would be used under tensile stress. Research is being continued to investigate this effect further and possibly develop methods of design for commercial prestressed laminated beams. Major benefit could accrue to the laminating industry.

Improved log grades for ponderosa pine. An improved system for grading logs in trees was developed for ponderosa pine and sugar pine. The system has been adopted as standard for Forest Service usage in the 11 Western States and the Black Hills. As local lumber-yield tables are developed, widespread usage of the system for grading these valuable species is anticipated by other government agencies and by industry. Prior to this development, at least four different grading systems were used to grade pine logs in the West. The new system has several distinct advantages over the old systems: It gives better value separation between grades, is more consistent, and is easily learned and easily applied. Two publications are available--one explains the new system and its development, and the other describes and evaluates the various grading defects encountered in timber stands. Use of reliable log grades will facilitate marketing of timber and direct it into the highest value end uses.

Wood finishing. Wood is losing out to other more durable materials for exterior surfaces because paints and other finishes sometimes deteriorate prematurely on wood. Basic research into the reasons why paints fail revealed the existence of high swelling strains concentrated at the point between the summerwood and the springwood of each annual ring. Experiments showed that differences in swelling between the summerwood and the springwood are largely responsible for premature peeling and cracking of conventional oil-base primer paint. (See Figure Q-2). These findings prompted research on chemical and mechanical properties of more elastic films, made from vinyl acetate and ethylacrylate, with properties suitable for wood surfaces which have led to use of superior paints for exterior wood surfaces. Failure of wood finishes may also be related to chemical changes brought about in wood surfaces by weathering. Techniques are being developed to study the photochemical effects of exposure of wood to ultraviolet light.

Forest Products Utilization Research

The nose cone for the Polaris missile was developed as a result of research done at the Forest Products Laboratory working in collaboration with the Naval Research Laboratory. The insert picture is a full size cross section of the nose cone fairing showing wood laminations and attachment to the metal base. The nose cone is about 6 feet long and varies in diameter from 54 inches at the base to 27 inches at the apex. Wood was found to be the best material for this purpose. It is also much less costly than metals previously used.

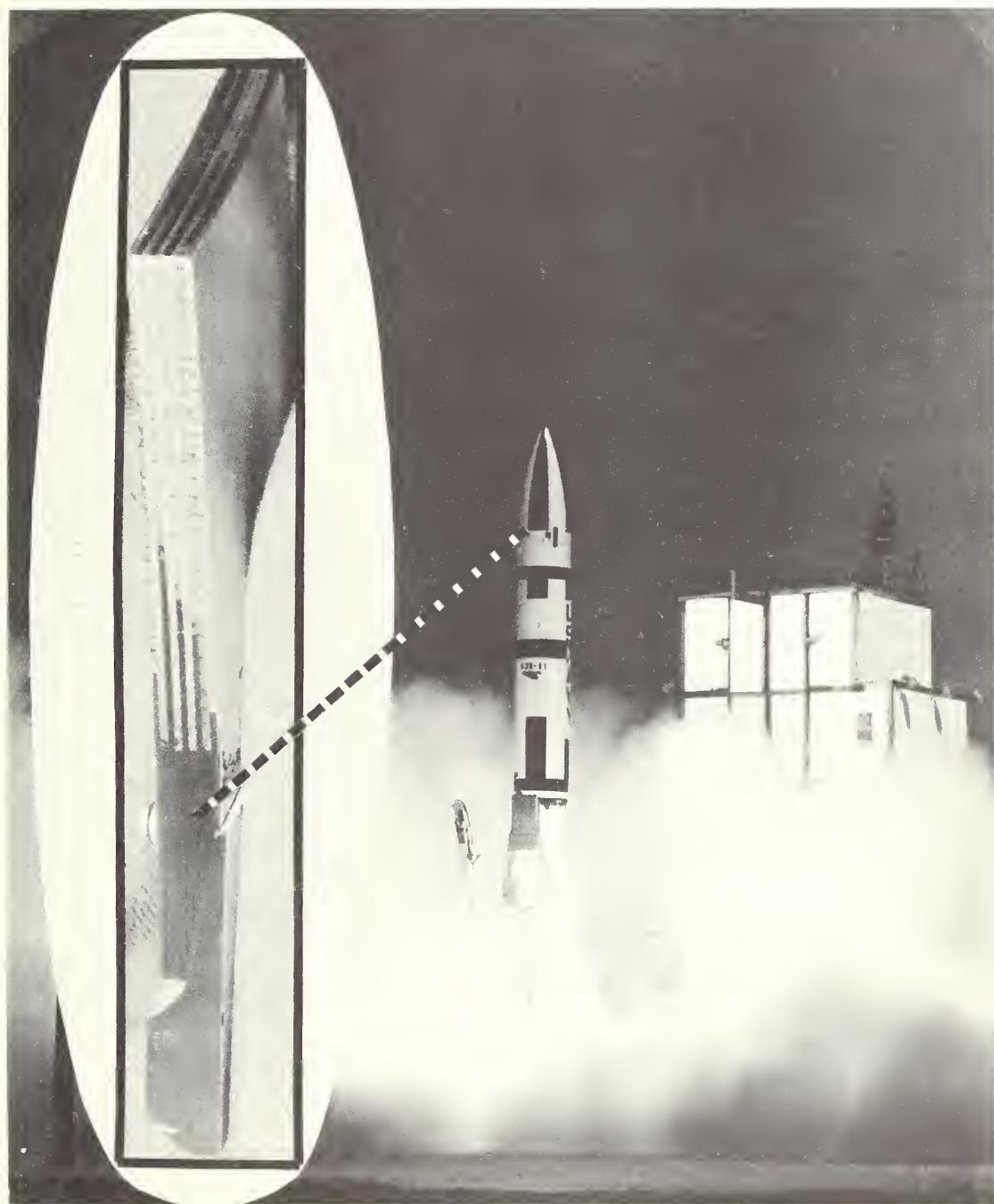


Figure Q-1

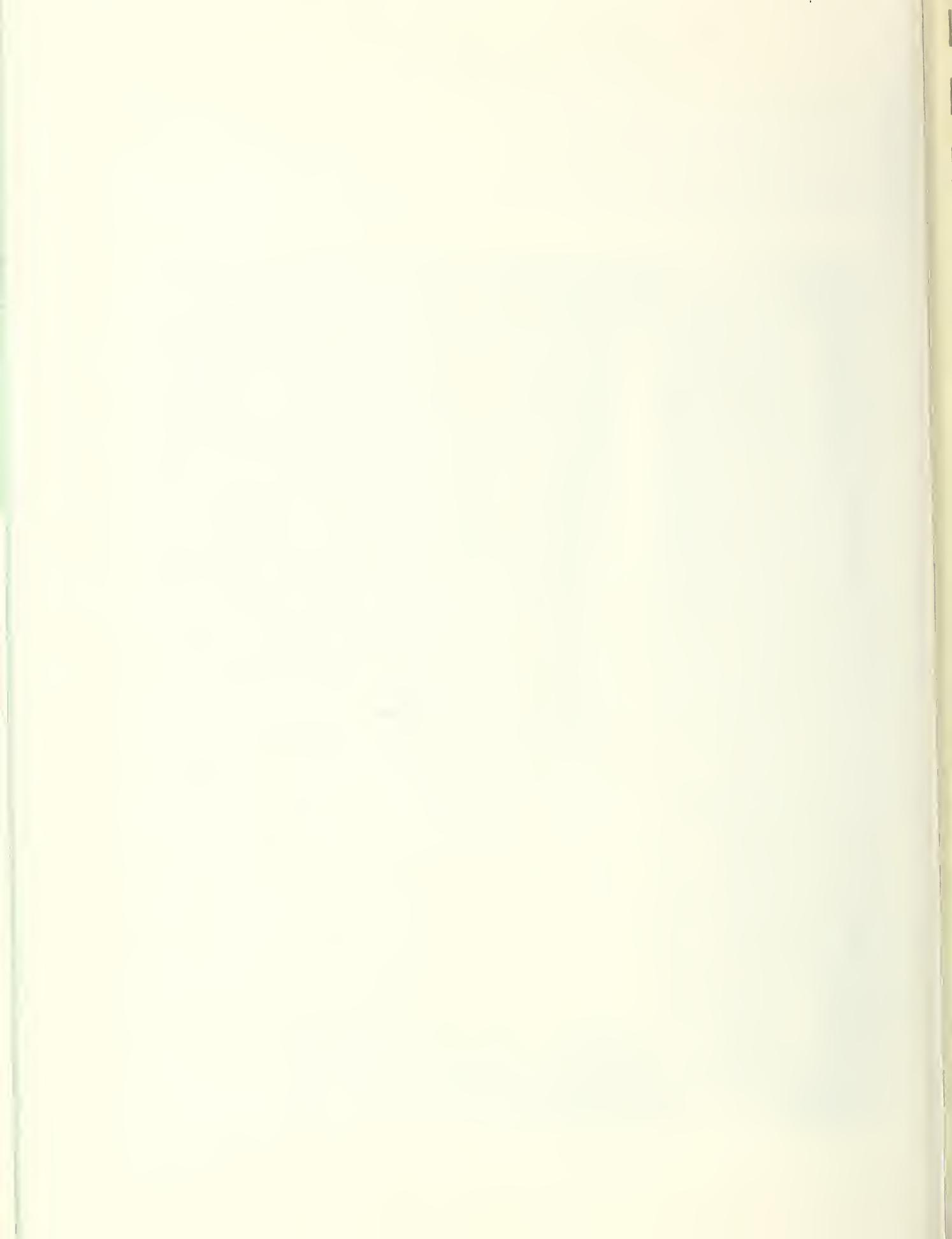




Figure Q-2

Why paints fail is graphically illustrated in this micrograph. The top picture shows a section of a dry painted board with an even surface. The lower picture shows this same board after exposure to the weather. Swelling at the springwood-summerwood interface has loosened the paint film (at the arrow). Research is finding ways to stabilize wood and to prevent shrinking and swelling.



(23) Forest engineering research \$75,000

An increase of \$75,000 would be used to develop new engineering systems for harvesting and transporting timber in situations where (a) low quality, small volume, or small size of timber leads to marginal operations, (b) National Forest timber is now inaccessible and incoperable because of excessive road building costs, and (c) new systems of logging are required on steep ground or high value watersheds.

Forest engineering research involves developing new systems and techniques of forest resource production, protection, and utilization that will lower costs and improve the efficiency of operations. It is concerned with better engineered performance and mechanization in the more complex aspects of multiple use practices. Multiple use requirements dictate that new and sometimes revolutionary systems be developed to facilitate protection and optimum production for all uses of the forest under intensive management practices.

Vastly improved transport and harvesting methods are needed to assure protection of soil and water resources, to harmonize timber harvesting with other multiple use requirements such as recreation, and to avoid loss of timber-growing areas to road rights-of-way. Industrial research in engineering has been confined to specific equipment for scattered unrelated projects with relatively limited objectives in contrast to research on coordinated systems required by multiple use considerations. The Forest Service's engineering research program is designed to fill this latter need. The relative inaccessibility of many National Forest lands and their high values for recreation, watersheds, wildlife, and timber require strong engineering advances.

It is estimated that in Oregon and Washington alone there are at least 28 billion board feet of timber characterized by low volumes per acre, steep terrain, or costly road access which will require special harvesting and removal techniques, such as by helicopter or other systems and machines specially developed to accomplish harvesting of this timber. In Alaska, there are an estimated 61 billion board feet of timber which cannot be successfully logged with conventional systems because they are either too costly to the operators or too damaging to soil, water, and scenic values. Logging systems and equipment specially designed for economical timber harvesting and cultural operations on small woodland ownerships are nearly nonexistent. Specialized equipment is urgently needed. In eastern hardwoods, some 74% of the total volume is considered low grade and culls. Vastly cheaper harvesting methods must be developed if such low-quality timber is to be removed economically and the sites replanted to better species. Sharply reduced nursery and planting costs are needed to accelerate the job of replanting 50 million acres of idle or poorly-stocked commercial forest land.

In fiscal year 1965 emphasis will be placed on evaluation and adaptation of helicopter logging systems in the Pacific Northwest and Alaska; low cost transport of wood pulp chips by pipeline or other methods that will permit economic utilization of small-sized timber; better engineered systems of harvesting low-grade timber on small forest properties and mechanization of harvesting and site conversion.

Examples of Recent Accomplishments

Helicopter logging. Studies have shown that use of helicopters in logging has the potential to reduce access costs, make otherwise inaccessible timber available, and to reduce damage to watersheds and recreation values--provided operating costs can be reduced. Two very critical operating problems now show promise of early solution. Scale studies of special accessory equipment to permit quick hook-on and fast release of logs have led to design of full scale mechanical log grapples, now ready for construction and test. A cooperative research study at the University of Washington is developing means to estimate log weights accurately to permit efficient loading of helicopters.

Studies and trial tests were made of the new concept of using helicopters to drag or pull loads instead of vertical lifting. Trials on dry ground and in water, the first of their kind, have been completed. Further studies are planned. (See Figure Q-3.)

Pipeline transport of wood chips. Studies to date have shown this transport method to have great potential in providing low-cost raw material for pulp, chemical conversion, and structural fiberboard plants. A mathematical model has been developed which will now permit analyzing as many as 16 variables affecting costs. Application to a pilot study area is planned.

Chipping-in-the-woods harvesting. Studies have shown significant potential savings in handling and transport of raw materials for chipped wood processes may be achieved by early breakdown of the log to homogeneous bulk form. While analysis has shown that systems using presently available equipment can be successful, there is need for lower cost log breakdown methods and radically reduced power requirements. Studies to meet these needs are underway.

Portable skidder harvesting system for small wood operation. A portable skidder especially developed for harvesting presently unused small wood in the South has reduced costs, made more pulpwood available and reduced site preparation costs. It has been estimated that the total savings in harvesting existing stands of small wood in the South could amount to \$60,000,000. The portable skidder is low in cost and permits small operators to get into business with a very low investment. Application of the portable skidder to other uses such as thinning in plantations and harvesting small-stemmed hardwoods is foreseen.



Entirely new concept developed for helicopter logging permits moving twice the normal load by dragging instead of lifting. The helicopter's potential for logging is greatly increased. Operations can be more flexible, such as in swamps or over snow.

Figure Q-3



(24) Forest survey	\$1,854,000
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An increase of \$150,000 would be used to accelerate and strengthen survey activities to make available essential forest resource information needed for planning major forestry programs and forest industrial development. Survey activities would be intensified especially in the Lake States, Pacific, and Southern regions where the need for up-to-date resource information is most pressing.

The forest survey provides a continuing inventory of the Nation's important forest land and timber resources including the area, location, and condition of forest resources, timber volumes available, rates of timber growth, cut and mortality, and trends in timber supplies. The forest resources of the Nation, comprising some 775 million acres, vary greatly in productivity and availability for industrial use and show widely divergent trends in growth and depletion. Federal, State, and local forestry agencies need up-to-date knowledge of the changing trends in timber supplies to provide an evaluation of the effectiveness of and need for forestry programs, including programs for redevelopment of rural areas where timber resources are important. Because of increasing pressures among the various uses of forest land, and rapidly changing resource and industrial conditions, forest industries rely more and more upon the forest survey for resource information essential to business decisions regarding land acquisition, wood procurement programs, and the feasibility and locations of new or expanded industrial plants.

The proposed budget will make possible increased survey efforts to more adequately meet needs for forest resource information in regions where timber supports a major segment of the economy. Special attention would be given to appraising the availability of timber resources for rural areas where timber is the primary resource available on which to base additional economic activity and employment. Surveys also would be accelerated in the Pacific and Southern States where rapid changes occur in timber resources due to growth, heavy industrial cutting, and changes in land use. As a result of inflationary factors and increased needs for resource data, the area surveyed annually has declined from about 53 million acres in 1949 to 43 million acres at present. Coverage of about 55 million acres annually, or an average resurvey cycle of about 10 years for the country as a whole, is deemed desirable to meet essential needs for resource data. Amendment of forestry survey legislation in 1962 raised the annual authorization for the forest survey from \$1,500,000 to \$2,500,000 to permit faster progress on this important research project. The requested increase will not permit meeting the goal of surveying 55 million acres annually but will reverse the downward trend of the last few years.

Examples of Recent Accomplishments

Progress on forest inventories. These inventories provide information to be used as a basis for new industry or industrial expansion and for review of timber resource situations and trends essential to the development of management programs. Field surveys during the past year were concentrated in Alaska, Washington, Oregon, California, New Mexico, Arizona, Minnesota,

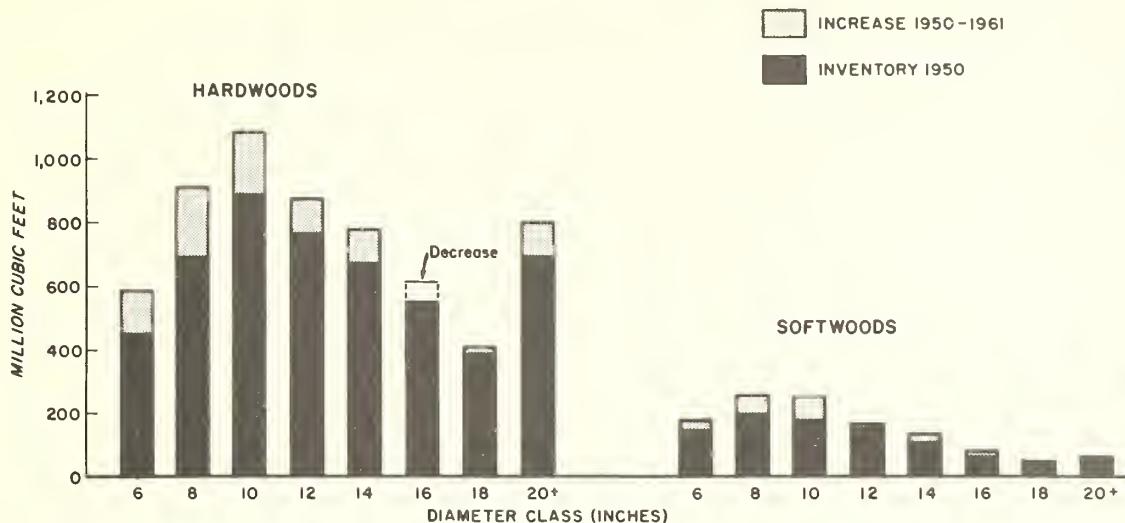
Illinois, Kentucky, Alabama, Louisiana, North Carolina, and Maryland. Examples of information obtained on forest resources and industries, trends in the forest situation, and forestry problems and opportunities are given in the following items:

Tennessee's timber resources increasing. Tennessee has more timber--both pine and hardwood--than it had a decade ago. Growing stock in sound well-formed trees at least 5 inches in diameter now totals 7 billion cubic feet, including 20 billion board feet of sawtimber. Total volumes of softwoods increased 33%, and hardwoods gained 22% in the 12 years since 1950. Softwood sawtimber volumes increased 37%, hardwood sawtimber 18%. Another favorable aspect was a 15% gain in hardwoods 18 inches and larger in diameter. Improved fire protection, ingrowth of young trees into sawtimber size, and more widespread timber management are largely responsible for the increases. Commercial forests now occupy 13.4 million of the State's 26.5 million acres. This is about a million acres, or 9% more forest land than in 1950, due mainly to reversion of farmlands to forest. (See Figure R-1.)

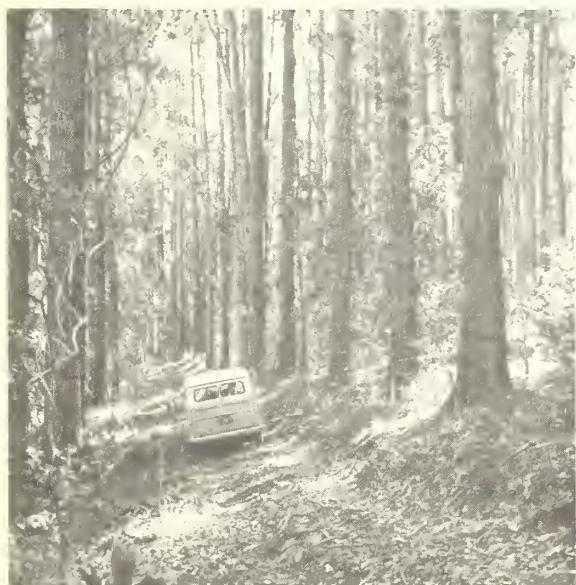
Forest resources of Hawaii surveyed. Hawaii has nearly 2 million acres of forest--almost half the total area of the State. About 1.1 million acres of this land, much of which is now poorly stocked with low-quality native forests, is considered capable of producing valuable crops of wood. Planted stands comprise 2% of the forest area but contain 23% of present sawtimber volumes. These planted stands average some 8,000 board feet per acre. Some planted forests show growth rates exceeding 3,000 board feet per acre per year, while many have growth ranging from 500 to 1,500 board feet per acre. Because of general land shortages, conversion of native cover useful only for watershed protection to forest cover suitable for multiple uses including production of water, timber and recreation, is of high importance. The information shows that future establishment of local timber industries may be feasible in an area heretofore totally dependent on the importation of timber products. (See Figure R-1.)

National timber situation reviewed. For the past year and a half a comprehensive study has been under way on the status of our Nation's timber resources as of 1962, and the outlook for future timber supplies and demands. Such national appraisals are made periodically as a basis for policies and action programs of forestry agencies, forest industries, landowners, and others. The last previous appraisal was based on data gathered primarily in 1952. Preliminary findings of this new appraisal indicate significant increases in forest areas, timber volumes, and timber growth in recent years. Total timber growth exceeds the total cut, but growth is still deficient in trees of larger diameters and preferred species. Projections of prospective demand show substantial increases for pulp and paper and for veneer and plywood, and modest increased in lumber use. Prospective timber supplies appear sufficient to meet most timber demands during the next few decades, but increasing supply problems for veneer logs and high-quality sawlogs, and increasing problems of timber cost and merchantability are in prospect. A detailed report on the results of this current analysis of the timber situation and outlook will soon be published.

INCREASE IN TIMBER RESOURCES OF TENNESSEE 1950-1961



The Forest Survey shows that Tennessee has more timber, both pine and hardwood, than it had a decade ago. Increased stocking is mainly a result of improved fire protection and more widespread forest management. Such information on forest conditions and trends in timber resources provides a basis for evaluating both public and private forestry programs and opportunities for industrial development. This type of information is particularly important for developing the timber-based industry potential in the many areas now experiencing severe economic distress throughout the Nation.



The recently completed Forest Survey of Hawaii shows some 21,000 acres in forest plantations, many of which produce as much as 3,000 board feet per acre annually, one of the highest rates of growth found in the entire United States. More than a million acres now poorly stocked with native forests useful only for watershed protection are capable, under multiple use management, of producing valuable crops of wood as well as water and recreational benefits.

Figure R-1



(25) Forest products marketing research \$1,016,000

No program increase is proposed for fiscal year 1965.

Forest products marketing research includes a wide variety of studies aimed at expanding uses of wood through development of more efficient arrangements and practices for harvesting, processing, selling, and distributing forest products. Marketing research also includes studies to appraise the feasibility of new or expanded timber industries, particularly plants based on low-quality timber of little-used species and the available resources in economic problem areas. Other research involves comprehensive analyses of trends in consumption and potential future demands for lumber, pulp and paper, and other wood products for construction, manufacturing, shipping and other end uses, and the relation of prospective markets and timber supplies.

Many forest landowners fail to realize full returns from timber management and harvesting because of lack of market knowledge and ineffective timber marketing systems. Inefficient processing and marketing of timber products results in low returns to many wood-processing industries and difficulties in competing with nonwood materials in many consumer markets. Development of new or expanded markets for wood products is of importance to several million landowners and is especially needed in low income rural areas in need of economic development. Research to appraise the outlook for future timber requirements and prospective markets is of particular importance both to wood-using industries and to Federal and State forestry agencies in guiding formulation of forestry policies and programs.

Emphasis will be given studies of possible methods for increasing efficiency and lowering costs in the harvesting, processing, and marketing of forest products in the major timber producing regions. Market development studies will determine the quantity, location, and kinds of timber available in specific areas, and the economic feasibility of establishing new or expanded wood-using industries, especially in heavily forested low-income areas. Research on timber valuation and pricing procedures will include methods for estimating logging and milling costs, end-product values, and profit allowances as a basis for improved appraisals in marketing both public and private timber. Studies will be continued of nationwide trends in present and prospective demands for wood products and competing materials and the outlook for wood in various markets. Such information, together with projections of timber supplies, is vitally needed for judging the Nation's timber situation and outlook and the need for major forestry programs.

Examples of Recent Accomplishments

Outlook for Naval Stores appraised. A comprehensive appraisal of the U.S. naval stores industry indicated that striking changes have occurred in sources of rosin even though total domestic production has changed little in the past 60 years. In 1900 all rosin was produced from pine gum, compared to 23% in 1961. Production of steam-distilled wood rosin from southern pine stumps started about 1910, increased to 70% of total production in 1955, then declined to 54% in 1961. Production of tall oil rosin from sulphate pulping liquors started in 1949 and has increased to 23% of total rosin output in 1961. Substantial further changes are expected in response to future domestic and foreign supply and market conditions. To meet prospective rosin demands in 1970, a projected 34% decline in wood rosin output is likely to be more than offset by increases of 75% in production of tall oil rosin and 65% in gum rosin production. Results of this study are of major importance to producers and consumers of naval stores throughout the world, and to industrial and forestry agencies concerned with management of southern pine resources.

Opportunities for increased efficiency in sawmills. A study of 29 Alabama sawmills showed that more than 8% of the salable volume of logs was lost by cutting lumber thicker and wider than necessary. Additional volumes were lost in trimming lumber to length. Miscut boards also proved to be more costly to dry, plane, and handle. These losses in the sample mills averaged from \$2 to \$4 per thousand board feet produced -- an amount that equaled or exceeded net operating returns in several instances. The findings of this study should lead to major improvements in sawing accuracy and reductions in costs in the mills sampled through application of quality control techniques.

Wood use in housing. Studies of wood products use in residential construction indicate losses of lumber markets by substitution of competing materials in different types of new single-family homes has been offset by increasing size of houses constructed during the past decade. Amounts of plywood, fiberboard, and other wood materials used per home have increased appreciably in this period. Total wood use per house has increased during the past 10 years mainly because the average size of houses built has been increasing and they have a garage or carport -- often a two-car structure rather than the one-car size that predominated in the early 1950's.

The wood content of new, single-family homes differs greatly among the various regions of the country. Thus in Florida, where masonry exterior wall construction predominates and most houses are built on a concrete slab, lumber use per FHA-inspected house now averages approximately 5,900

1

board feet (Figure R-2). In the North Atlantic region, where approximately 93% of the houses have wood frame exterior walls and only 6% are built on a concrete slab, lumber use per house averages 12,100 board feet. Similarly, plywood use per house ranges from about 800 square feet in the Southwest to more than 2,700 square feet in the North Atlantic region. The results of this research will benefit the timber industry in its efforts to hold markets and develop new outlets for wood products.

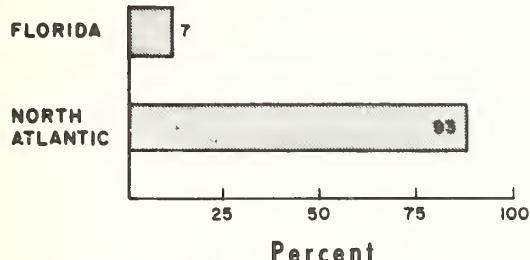
Pulp and paper making opportunities in west-central Colorado. An evaluation of the costs and availability of wood, water, labor, power, transportation, and other items indicate that a good opportunity exists for pulp and paper manufacture near large, growing markets in western Colorado. Timber stands in the area could support an estimated production of at least 600 tons of newsprint daily. Additional wood supplies are available from dead timber and from chippable waste available at sawmills. Wood could be obtained at several likely millsites for a delivered cost of \$20 per cord or less. The Colorado River has enough pulpmill effluent assimilative capacity to sustain a production of 2,000 tons a day of kraft pulp, 360 tons a day of semi-chemical pulp, or 20,000 tons a day of ground wood pulp distributed among at least four suitable mill locations. Water for pulp and paper manufacture is of acceptable quality with minor treatment. The large and growing paper markets of the area could be served at relatively low freight rates from the potential mill locations.

Progress at Princeton, West Virginia Laboratory. Good progress is being made in a number of studies at the Princeton, West Virginia, Forest Products Marketing Laboratory. A report on the availability of lumber and residue at sawmills in West Virginia was made. It shows that West Virginia could supply raw material to a variety of new or expanded wood-using industries. In addition to this study, reports on five areas outlining the timber supply and other factors of production such as availability of water, labor, and transportation were made. Assistance by the Laboratory staff was given a number of prospective industries and the trend in new or expanded plants continues to be upward in the Appalachian region. Last year there were 33 such plants established in West Virginia alone.

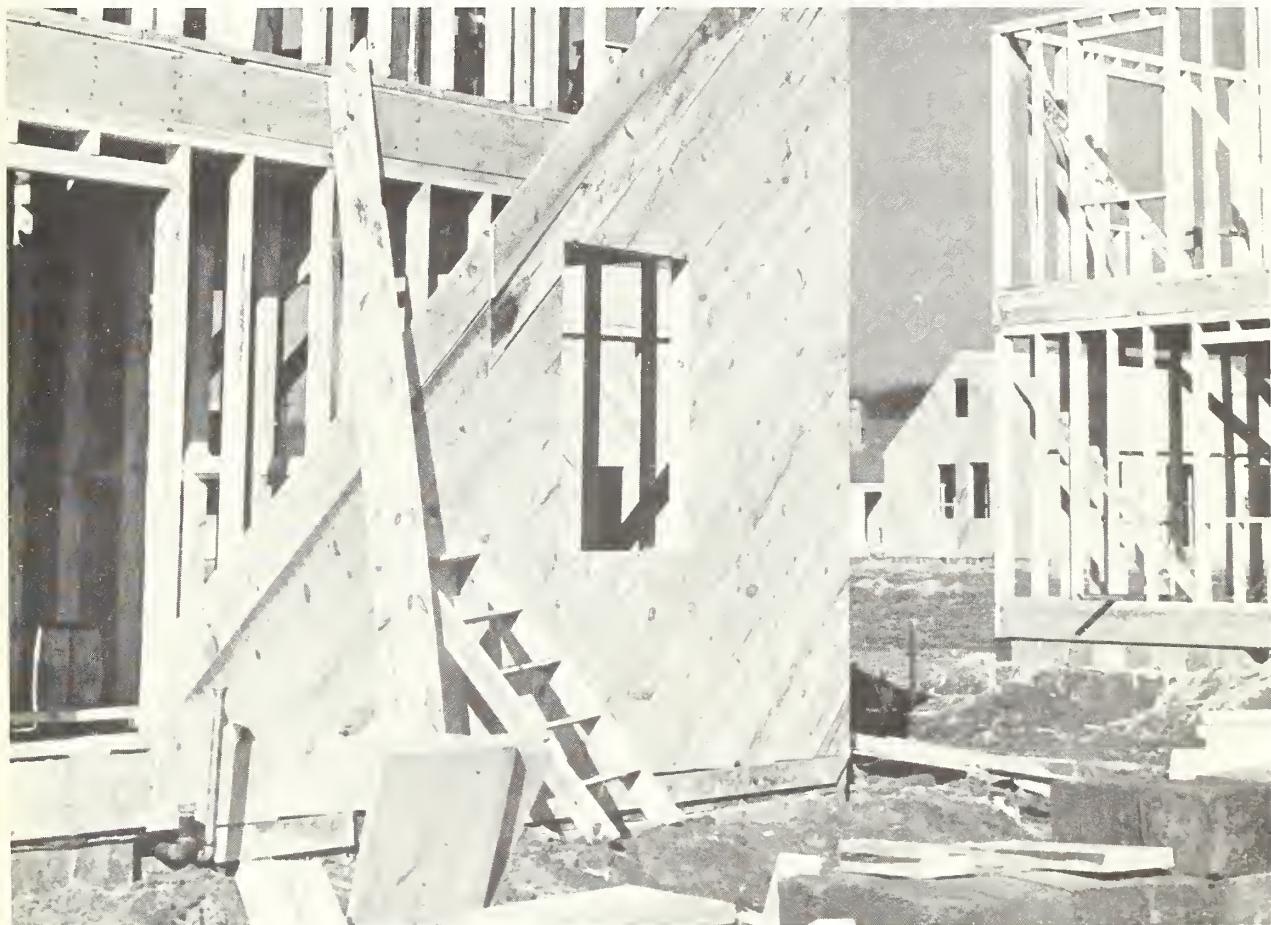
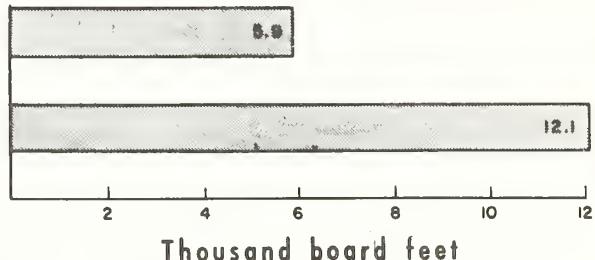


HOUSING CHARACTERISTICS AND LUMBER USE 1962

WOOD FRAME CONSTRUCTION



LUMBER USED PER HOUSE



Studies of trends in construction characteristics and changing use of wood and competing materials provide a basis for appraising timber markets and the adequacy of prospective timber supplies.

Figure R-2



(26) Forest economics research \$540,000

No program increase is proposed for fiscal year 1965.

Forest economics research provides information on income, prices, costs, and investment guides relating to use of the 4.5 million individual forest ownerships that make up some 60% of the Nation's commercial forest land, to the management of more than 60 million acres of industrial forests, and to the administration of 130 million acres of National Forests and other public lands. This research includes studies involving the economic benefits from establishing, managing, protecting and harvesting of timber crops; the development of principles and guides for the coordinated management of timber and other land uses for water, recreation, livestock and wildlife; and the evaluation of alternative public and private forestry programs on various classes of ownership.

Pressures on both public and private forest lands for production of timber, recreational services, and other products of the land are steadily increasing, and problems of achieving efficient allocation of capital and administration of forest land have correspondingly intensified. Forest economics research serves to guide actions to achieve increased benefits from the most efficient forest enterprises, and to provide an objective basis for resolving problems and conflicts in an expanding forest economy.

Research must identify the most promising opportunities for improving forest income and employment and determine possible adjustments in public forestry programs or new measures for improving the level of management and productivity on the vast forest area in small forest holdings. Research will be continued in all important forest regions to appraise the benefits realizable from investments in planting, timber stand improvement, and other land treatment measures as influenced by site, accessibility, markets, and other factors. Studies of the economic aspects of insect and disease control programs relating to white pine blister rust and dwarfmistletoe, for example, will be continued in the West and Northeast as a guide to size and intensity of programs. Research on critical problems of multiple use management will also be continued in the West to help resolve conflicts among recreation, timber, and other forest land uses in problem areas where there is need for improved economics criteria to guide the management of forest land.

Examples of Recent Accomplishments

Guides for timber stand improvement investments. Basic concepts, principles, and methods for planning investments in timber stand improvement were developed. Emphasis was given to determinations of the optimum allocation of public funds for alternative stand treatments and producing units to serve as a guide for the most effective allocation of funds. A handbook for evaluating timberstand improvement projects on the National Forests in

terms of prospective costs and benefits is being prepared as an aid to foresters concerned with planning and administering such work. (See Figure R-3.)

Landowners and industries benefit from tree farm families. A survey and analysis of Tree Farm Families was completed to determine the effectiveness of programs designed to aid owners of small forest properties. In 1961 more than 500 owners in the Mid-south, with nearly 500,000 acres of woodland, had informal cooperative management agreements with forest industries. Half of these owners had woodlands larger than 250 acres; 40% had tracts of 50-249 acres; and 10% had areas less than 50 acres. About 40% of the owners were absentee owners. Three-fourths of the owners cited free technical forestry assistance as the main advantage of cooperation; assurance of markets for timber was next in importance. The industries expected cooperating landowners to give them first refusal on stumpage sales. Cooperative agreements for the most part were informal and unwritten. Further expansion of this type of industrial cooperation and service appears to provide an important way of improving productivity of small woodland ownerships.

Improved forest land classification for tax assessment. A study in northeastern Wisconsin to develop an improved forest land and timber assessment classification for use under the general property tax showed that, at the present time, there is little or no correlation of sale prices of timberlands with classifications of timber characteristics such as stand size, species, composition, and stand density or other factors such as nearness to markets, transportation facilities and size of property. There is need for both improved classification of property and for guides to evaluate all relevant factors in forest assessment. Future research based on these findings, will be designed to improve forest land and timber tax classification procedures.



For example, if aerial or ground herbicide spray treatment is not practical or economical, undesirable trees may be selectively killed by other methods, such as girdling---



Investments in timber stand improvement to remove over-topping low grade hardwoods increase returns from the more valuable softwoods. Forest economics research evaluates costs, returns, and profitability of alternative forestry measures under various conditions to provide basic guides for forestry investments and programs of landowners, timber industries, and public forestry agencies.



---or by injecting herbicide into the base of individual trees.

Figure R-3

(27) Forest research construction \$3,800,000

An increase of \$3,165,000 would be used for construction of an addition to the Forest Products Laboratory, Madison, Wisconsin. In fiscal year 1963 Congress appropriated funds for the architectural and engineering planning of this laboratory so construction could be started early in fiscal year 1965. The proposed construction is an addition to the existing laboratory built in 1932 which is now entirely inadequate. The added space would accommodate research emphasizing the development of new uses and improvement of existing uses for wood and fiber products. Also, space would be provided for research in wood chemistry, wood engineering and wood quality. The proposed facility is essential to speed research on problems confronting a country-wide distressed domestic lumber industry. This work will directly benefit many of the rural areas currently experiencing economic distress where the lower-quality timber and the sizes and species now little used predominate. Finding ways to effectively utilize these timber resources is basic to the development and operation of permanent timber-based industries which will provide stable employment, markets for existing forest products, and improved local economies. Such utilization will also materially add to the usable timber resources of the Nation for meeting future forest products needs.

No other major construction is provided for in 1965. However, approximately \$60,000 of other research project funds will be used in connection with the planning and design of a combined Regional Office and research station headquarters at Philadelphia, Pennsylvania.

The 1964 appropriation provided for the following non-recurring construction items:

Alexandria, Louisiana	\$450,000
Designs and specifications for the following:	
Morgantown, West Virginia	31,500
Ft. Collins, Colorado	79,000
Sewanee, Tennessee	18,500
Missoula, Montana	28,000
Houghton, Michigan	28,000
Total	<u>\$635,000</u>

Examples of Recent Accomplishments

The architectural and engineering work on all research laboratories funded in fiscal year 1963 was completed and construction contracts let. Construction is underway and on schedule for the laboratories at Tempe, Arizona;

Project (27)

Logan, Utah; Alexandria, Louisiana; Parsons, West Virginia; and Warren, Pennsylvania. In addition, all work has been completed on the auxilliary facilities provided for in the fiscal year 1963 appropriation at several additional locations. Architectural and engineering plans for the Forest Products Laboratory addition proposed at Madison, Wisconsin are virtually completed.

Plans are finished for completing the laboratory at Alexandria, Louisiana, funded in fiscal year 1964, and construction work is underway. Contracts for the architectural and engineering planning of five laboratories provided for in the fiscal year 1964 appropriation are being negotiated or have been let.

Several laboratories were completed during the past year and are now in operation. These facilities are adding substantially to the progress of research underway at these locations. (See Figure S-1.)

Laboratory Construction



Pacific Southwest forest fire control laboratory, Riverside, California.



Insect and disease, forest products studies, and silviculture laboratory, Athens, Georgia.

Figure S-1





(28) Cooperation in forest fire control \$12,758,000

An increase of \$250,000 would be used to strengthen this program which covers about 440 million acres of forest land and nonforest watersheds in 49 States. These State and private forest lands produce 85% of all our forest products and play a key role in the Nation's economy. The annual burn on these lands is being reduced, but still far too much is burning each year. Over the past 10 years the annual burn has averaged almost 6 million acres, an area the size of Vermont. The direct losses during this same period averaged \$80 million each year, including damage and costs. This reported loss does not include indirect losses to timber due to decay following a forest fire, replacement of desirable species by less valuable ones; or site deterioration and erosion, uncertain stream flow; or the destruction of fish and game habitat, and recreational resources.

The Forest Service cooperates with the States to secure permanent and adequate fire protection for State and private forest and watershed lands. Each State exercises direct supervision and administration of the fire job within the State but Federal guidance, leadership, and financial assistance are necessary for nationally correlated permanent and adequate fire protection. State forestry agencies are doing much to reduce fire losses. Single forest fires that burned 3 million acres were not uncommon in the early 1900's. Losses to forest resources were severe and lasting. As a result of State-Federal efforts large fires are now uncommon and resource losses have been greatly reduced. The most recent study shows that it would cost \$83.5 million annually to provide adequate protection to 435 million acres of forest and watershed lands. In fiscal year 1962 total Federal-State expenditures were over \$64 million. The Federal contribution to this program was \$12.5 million. In spite of this progress, fire protection effort is only about 75% of that needed. Not all of the acres in need of organized protection is now getting it. Some 24 million acres are unprotected and over 200 million acres are not well enough protected to prevent excessive fire losses during hazardous seasons.

The 1964 appropriation is \$12.5 million. Annual State and private expenditures during the past 10 years have increased by over \$26 million. During the same period, Federal funds increased but \$3 million.

Fifteen years ago Federal financial assistance in cooperative forest fire control was 40% of the total cost, ten years ago it was 25%, and now it is 18%. The Clarke-McNary Act authorizes a 50/50 sharing of the costs and an annual appropriation of \$20 million.

Adequate forest fire protection is particularly important to the economically distressed areas as their future economy is so greatly dependent upon their timber, recreation, wildlife and water resources. Due to the nature of the fire problem, such protection must be provided through the States, as it is impossible for the individual small landowner to provide adequate fire protection for his lands. Failure to provide such fire protection can result in the destruction of these resources with a resulting serious immediate and long-term economic impact.

The proposed 1965 program would make possible some intensification of protection on lands now under organized protection but where serious fires occur during hazardous fire weather due to protection inadequacies. The increase would be used to add fire protection manpower and equipment. Fire prevention work would be stepped up by using more manpower and educational equipment to reduce the mounting number of fires. With more and more people using the forested areas, the chances of fire starting has increased. There has been an average of 112,000 fires each year over the past 10 years. The number of wild fire starts has not been in a steady decline as has the area burned. Ninety-seven percent of these fires are man-caused.

Examples of Recent Accomplishments

During 1962 organized forest fire protection was extended to an additional 6 million acres of non-Federal forest land, and nonforest watershed land. This is an important step forward as the unprotected lands are burned at a rate of 90 acres per 1,000 acres, while the protected area is burned at a rate of only 4 acres per 1,000 acres. This points to a saving of 86 acres per 1,000 acres when the land is placed under organized protection (Figure T-1a). At present 24 million acres are still unprotected.

Severe fire weather in the Eastern and Southern States resulted in a nationwide increase in the number of fires and area burned. Fluctuations in numbers of fires and in acreage burned point to the need to strengthen the forces in areas now under organized protection to cope with bad years. (See Figures T-1b and c.) It is estimated that more than 200 million acres now under protection need better protection.

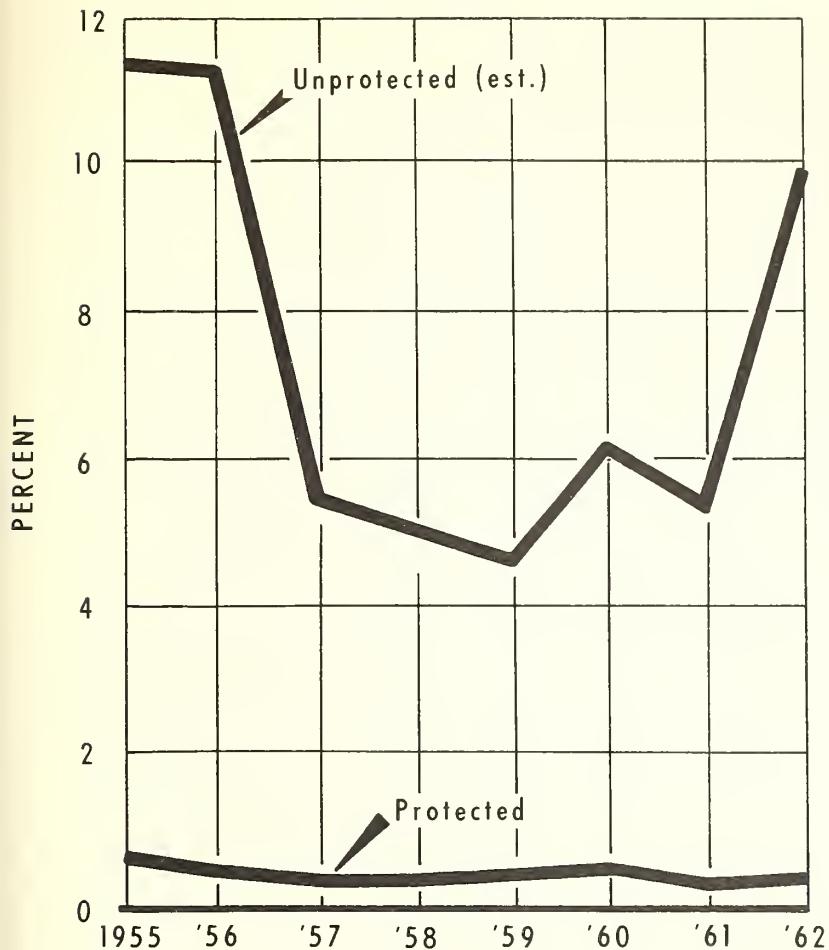
Federal funds for this program in 1963 and 1964 remain at the same program level as fiscal year 1962. State and private expenditures continued to increase at an average of about \$3 million, which has been the average annual increase over the past 7 years. (See Figure T-2.) Direct Federal financial participation was less than 20% in 1962.

The use of the new procedure in collecting and reporting fire data will make possible a deeper study of the fire control program and provide better administrative guides for a more efficient program.

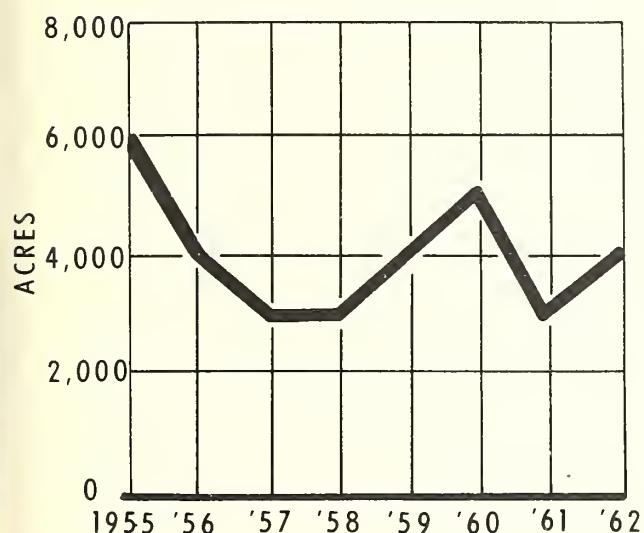
The following table shows fiscal year 1964 tentative allotments to States and the fiscal year 1963 expenditures for the State and private cooperative forest fire control program.

^{1/} While the amount available to a State may, if the allotment is small, exceed previously computed expenditures by that State, the actual payment to a State never exceeds State and private funds expended by or expended under the control of the State.

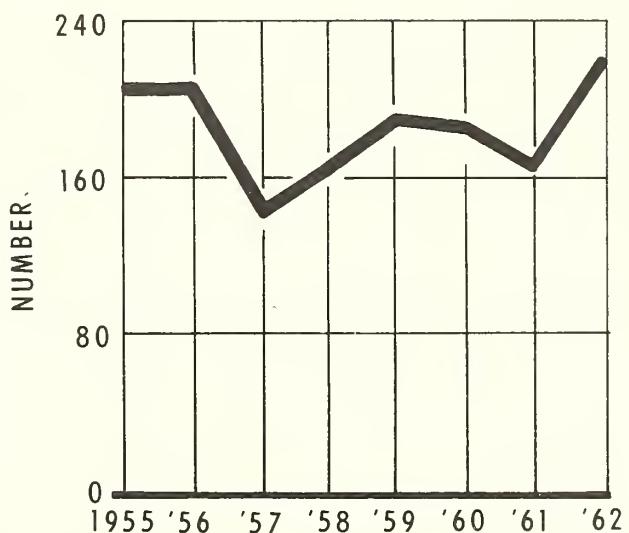
	State and Private Funds Expended F.Y. 1963	Federal Allotments F. Y. 1964 1/
Alabama	\$ 1,134,546	\$ 390,500
Alaska	188,569	47,000
Arkansas	1,103,773	375,500
California	16,537,366	1,112,000
Colorado	123,891	48,200
Connecticut	311,514	61,200
Delaware	15,264	15,500
Florida	3,231,441	571,200
Georgia	3,035,464	575,200
Hawaii	33,065	30,000
Idaho	449,555	201,500
Illinois	135,888	68,100
Indiana	114,825	51,900
Iowa	81,328	47,000
Kansas	8,908	15,000
Kentucky	791,423	246,400
Louisiana	1,704,659	477,100
Maine	981,953	330,300
Maryland	451,061	149,800
Massachusetts	387,369	133,500
Michigan	1,964,735	480,300
Minnesota	751,900	302,900
Mississippi	1,868,567	457,700
Missouri	823,679	274,700
Montana	372,929	137,300
Nebraska	15,909	25,000
Nevada	250,015	52,100
New Hampshire	239,633	85,200
New Jersey	503,713	130,100
New Mexico	141,371	47,000
New York	828,397	289,700
North Carolina	1,591,100	451,900
North Dakota	9,235	14,000
Ohio	322,755	120,400
Oklahoma	203,428	168,800
Oregon	2,436,856	544,200
Pennsylvania	1,159,609	255,700
Rhode Island	118,797	47,000
South Carolina	1,408,155	387,700
South Dakota	65,832	47,000
Tennessee	1,158,529	355,200
Texas	869,450	338,100
Utah	117,491	47,000
Vermont	55,545	47,000
Virginia	1,155,517	355,600
Washington	2,940,095	553,500
West Virginia	366,697	167,200
Wisconsin	1,641,810	423,800
Wyoming	41,384	47,000
Administration, Inspection, Prevention and Special Services to States	<u>865,500</u>	<u>914,500</u>
GRAND TOTALS	55,110,495	12,514,500



(a) During the past 10 years the percent of State and private area burned on unprotected land has averaged 18 times that of protected land.



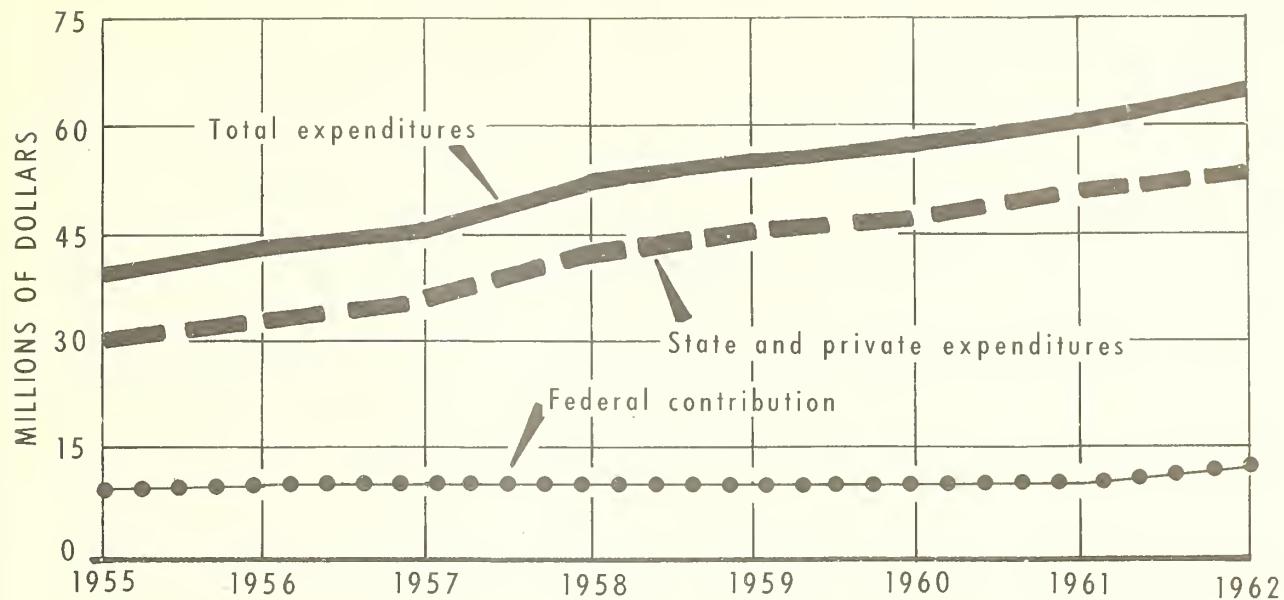
(b) The trend in burned area per million acres protected reflects the impact of inadequate protection on some of the protected lands. Annual losses are excessive.



(c) This chart shows the number of man-caused fires per million acres of State and private lands protected. About 96 percent of all fires are man-caused and can be prevented.

Figure T-1

Cooperative Forest Fire Control



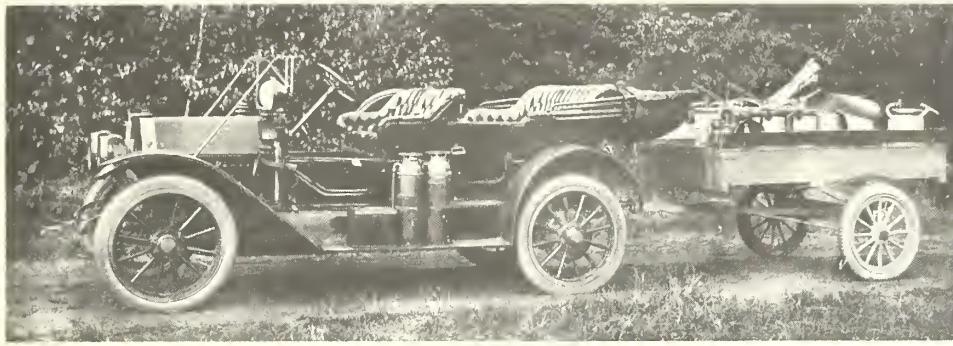
Federal leadership and financing have contributed materially toward providing satisfactory fire protection for State and private lands but protection is still only about 75 percent adequate. Federal cost sharing has not kept pace with State and private program expenditures.



Hopes for the future have gone up in smoke due to someone's carelessness. Forest fires in young stands of timber reduce growth of forest products by many millions of dollars. Adequate protection must be provided if this Nation's forestry resources are to contribute their full share to the economy and meet the needs of future generations.

Figure T-2

Cooperative Forest Fire Control



Improvements in equipment and firefighting techniques have contributed much to the effectiveness of forest fire protection. In 1922, fire equipment was generally limited to hand tools.

Modern bulldozers, fire plows, airplanes, fire trucks, etc., provide the tools needed for adequate forest fire protection.



Figure T-3

(29) Cooperation in forest tree planting \$300,000

No program increase is proposed for fiscal year 1965.

The Forest Service cooperates with the States through financial assistance and technical and other services in the production, acquisition and distribution of forest and windbarrier planting stock to assure an adequate supply for planting at a reasonable price that will encourage forest tree planting on private and non-Federal public lands. Current estimates indicate that there are 70 million acres of unproductive lands in these ownerships in need of forestation by planting and seeding. At the current forestation rate, it would take over 70 years to accomplish this forestation work. Most estimates of future needs for timber indicate that the rate of forestation needs to be at least doubled or possibly tripled. Federal leadership and financial participation is necessary to restore these unproductive lands to productivity and meet the Nation's timber resource needs and strengthen the basis for stronger local economic stability. This cooperative forest tree planting program also provides, from State-owned forest tree nurseries or by purchase from commercial nurseries, planting stock needed for Federal conservation programs under authority of the (a) Agricultural Conservation Program, (b) Flood Control Acts of 1936 and 1944, (c) Title IV of the Agricultural Act of 1956, (d) Watershed Protection and Flood Prevention Act of 1954, (e) Great Plains Conservation Program, and (f) Food and Agricultural Act of 1962.

Program objectives are, through cooperation with 48 States and Puerto Rico, to maintain in efficient operating condition more than 100 State forest and windbarrier planting stock nurseries and packing, distribution, seed processing and seed and seedling storage facilities, and to use effectively these facilities to grow and distribute windbarrier trees for planting on non-Federal land. The Federal financial contribution cannot exceed in any State the net State expenditures. Of particular importance is the support to be provided the States in the improvement of nursery facilities and operation, planting stock storage and transportation facilities, seed acquisition, production, processing and storage in addition to financial help in growing and delivering the planting stock to landowners at reasonable prices. A strong nationwide State tree planting stock production and distribution program will be maintained to meet on short notice increases in demand for trees which could develop from the tree planting incentives in the Food and Agricultural Act of 1962, Public Works acceleration or other programs.

The 1965 objective is to assist the States in production of 800 million high quality seedlings for distribution to private landowners for reforestation of approximately 1 million acres.

Examples of Recent Accomplishments

The Federal-State cooperation in the production and distribution of forest and shelterbelt planting stock for use on non-Federal land continued at about the same level as has existed since fiscal year 1960. However, State and other public and private nurseries producing forest tree nursery stock have operated at a reduced level. During the peak years of 1959 and 1960, when annual planting on private land approached 2 million acres, the soil bank program was at its height and contributed materially to the interest in forest tree planting (Figure T-4.) Forty-eight States and Puerto Rico continued to cooperate in the planting stock program under agreements with the Department of Agriculture.

During the past few years some States and forest industries have made special efforts to develop seed orchards for the production of improved strains of forest trees. They also have planned and developed seed production areas by selecting favorable stands of native stock and applying special cultural measures that include thinning, weeding, and fertilization. These long-range plans will produce seeds for the production of superior planting stock that will improve timber yields and quality shelterbelts.

Continued improvements in nursery practices and skills are resulting in better planting stock. Some of these improvements include advancements in seeding, weeding, soil management, insect and disease control, storage, grading and handling enroute to the planting site. These, along with improved planting techniques, are resulting in better survival, more rapid growth, and reduced costs for establishing a desirable stand of forest trees or shelterbelts (Figure T-5.).

The number of trees shipped to landowners during each of the past five fiscal years in comparison with all forest and shelterbelt trees produced by public and private nurseries is as follows:

<u>Year</u>	<u>State Cooperative Program</u>	<u>Other State Distribution</u>	<u>Total Output All Nurseries</u>
1959	945,464,000	630,766,000	2,080,122,000
1960	844,599,000	522,830,000	1,918,746,000
1961	774,159,000	248,186,000	1,537,558,000
1962	670,000,000	28,000,000	1,100,000,000
1963	576,000,000	56,000,000	1,100,000,000

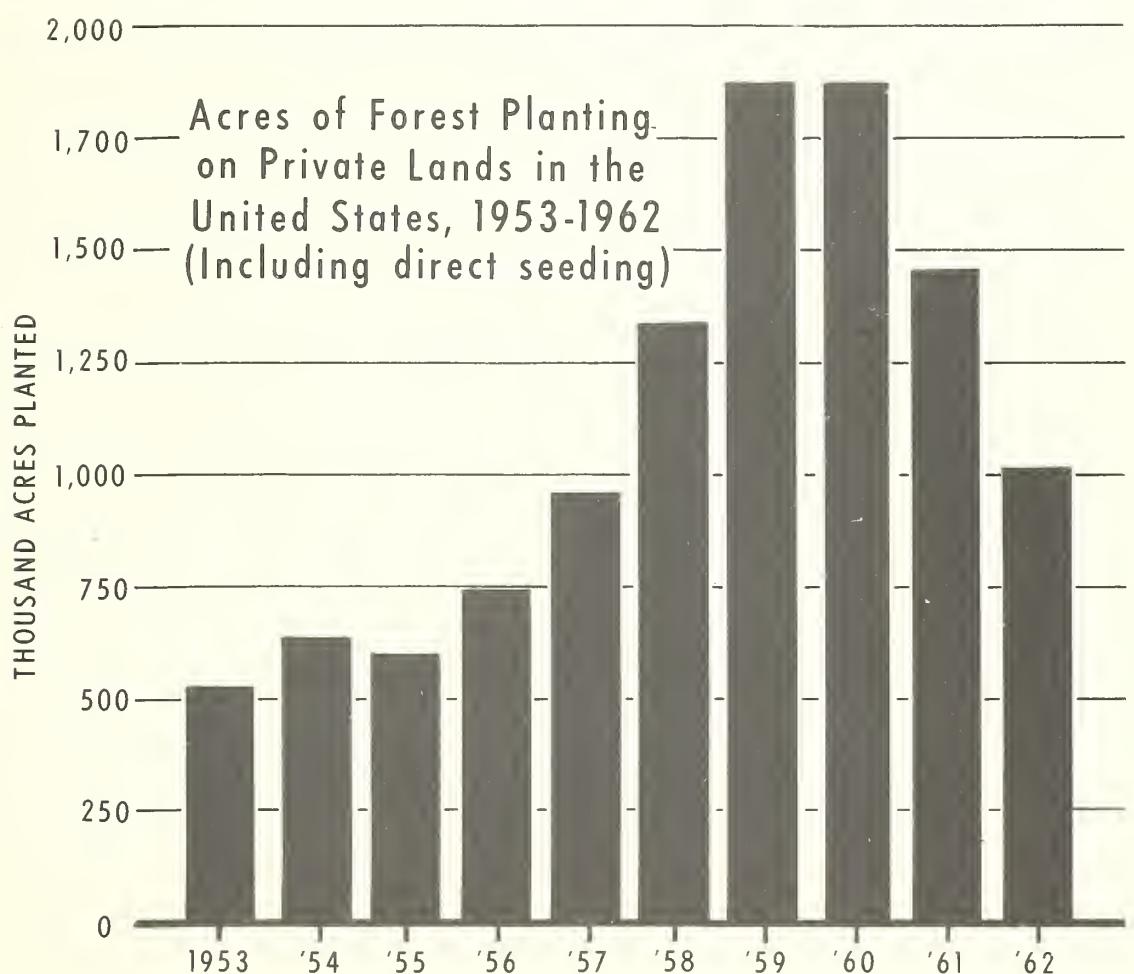


Figure T-4



State nurseries are providing excellent low-cost tree seedlings for forest and shelterbelt planting. Efficiency and economy have been achieved as a result of improved nursery facilities, irrigation, chemical disease and weed control, and efficient management.

Figure T-5

(30) Cooperation in forest management and processing \$3,018,000

An increase of \$500,000 would be used to provide technical assistance to an additional 18,000 of the owners of the Nation's 4.5 million small private forests and to 1,000 of the 50,000 operators of small sawmills and plants processing primary forest products. The owners to be served do not have the necessary technical skills to manage their forest lands or market specialized products. The processors of primary forest products to be served through whom small woodland owners find markets need technical assistance in processing and marketing timber and other forest products. These technical services will derive from the affected local forest resources the benefits for the rural community that these resources are potentially able to contribute.

The objectives of the program are to help as many of the owners and the loggers and processors serving them as is feasible to produce a greater volume, variety and value of products from the 257 million acres of small private forests. Local economies in particular and the National economy in general will be benefited by improved returns to the small woodland owner. Improved management of these small forest ownerships will contribute to the solving of rural area and community problems of underemployment and low income and to the general economic and social well-being of rural areas.

To accomplish these objectives the Forest Service cooperates with 49 States and Puerto Rico. Through this program the States employ service foresters to provide technical advice and service to woodland owners in multiple use management which includes tree planting and seeding; natural regeneration of timber stands; protection from fire, diseases, insects and animals; timber stand improvement; timber harvesting; marketing of timber and special forest products; erosion control on woodland and logging roads; watershed protection; woodland grazing and recreation and wildlife management. These service foresters or other specialists employed by the State Foresters also give technical advice to loggers and processors on improved techniques, making more complete and better utilization of the timber, reducing costs, and making better products. They also assist in locating markets, determining market demands, improving marketing procedures and scheduling production to meet market needs.

The service foresters directly support other related National programs including Rural Areas Development, Area Redevelopment, Civil Defense, Agricultural Conservation, Soil Conservation Districts, and the Farmers Home Administration forest credit program.

The proposed fiscal year 1965 financing, when matched with State funds, would make it possible to provide assistance to 111,000 forest landowners and 10,000 processors of primary forest products.

Project (30)

100-100

Examples of Recent Accomplishments

The following tabulation shows the accomplishments in Cooperative Forest Management and Processing for fiscal year 1963:

Activity	Unit	Accomplishment
Owners given woodland management assistance	Number	101,823
Area receiving management assistance ...	Acres	5,762,008
Timber products sold or harvested	MBF <u>a/</u>	588,046
Value of timber products sold or harvested	Dollars	13,743,523
Young timber saved from premature harvest	Acres	206,737
Owners referred to consulting foresters for additional assistance	Number	1,524
Area involved in above referral	Acres	619,292

a/ Thousand board feet

Forty-nine States participate in this program. In fiscal year 1963 the States contributed \$2,341,562 and the Federal Government provided \$1,507,013. Only about 2% of the Nation's woodland owners were assisted during the year by the 691 available "service" or farm foresters. The relationships of the number of service foresters to the number of woodland owners assisted in better management and to the acres of woodland affected by management assistance are shown in Figure T-6.

In addition to better management for timber production, increased emphasis is being placed on better management of other forest resources for multiple uses such as recreation, and fish and game (Figure T-7).

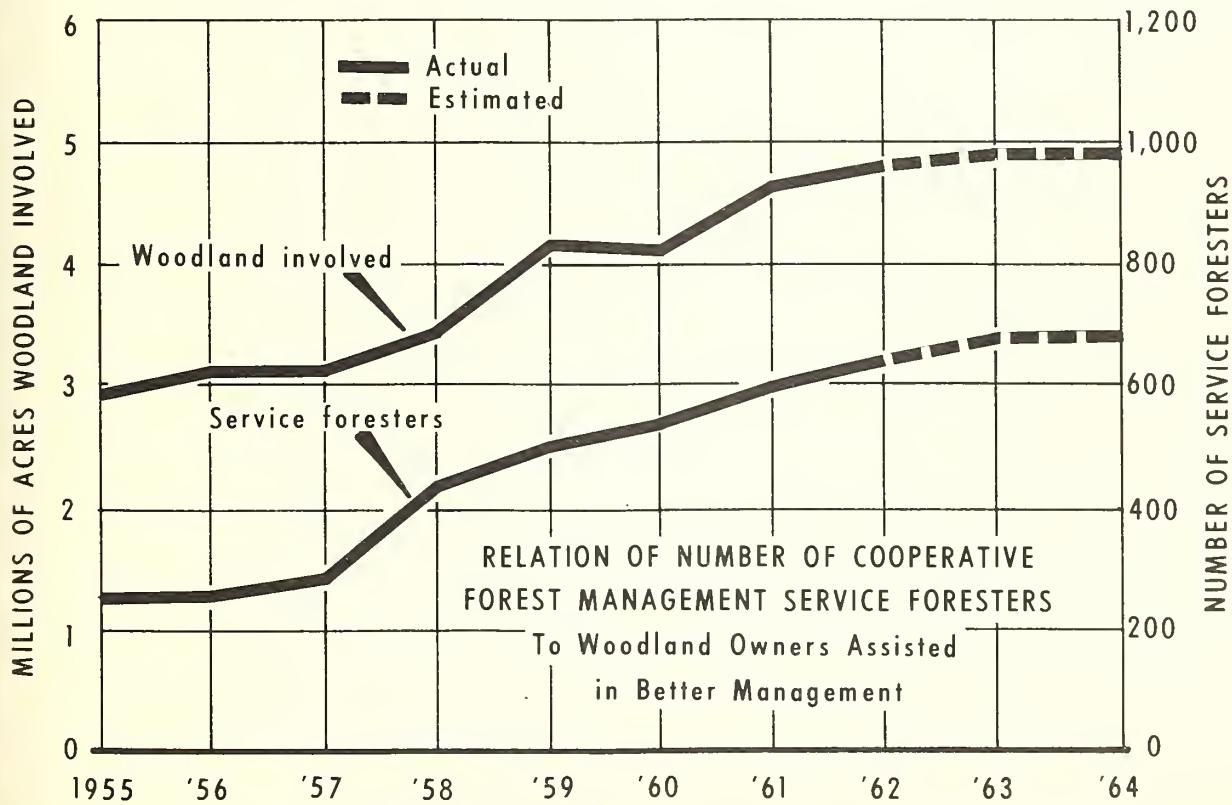
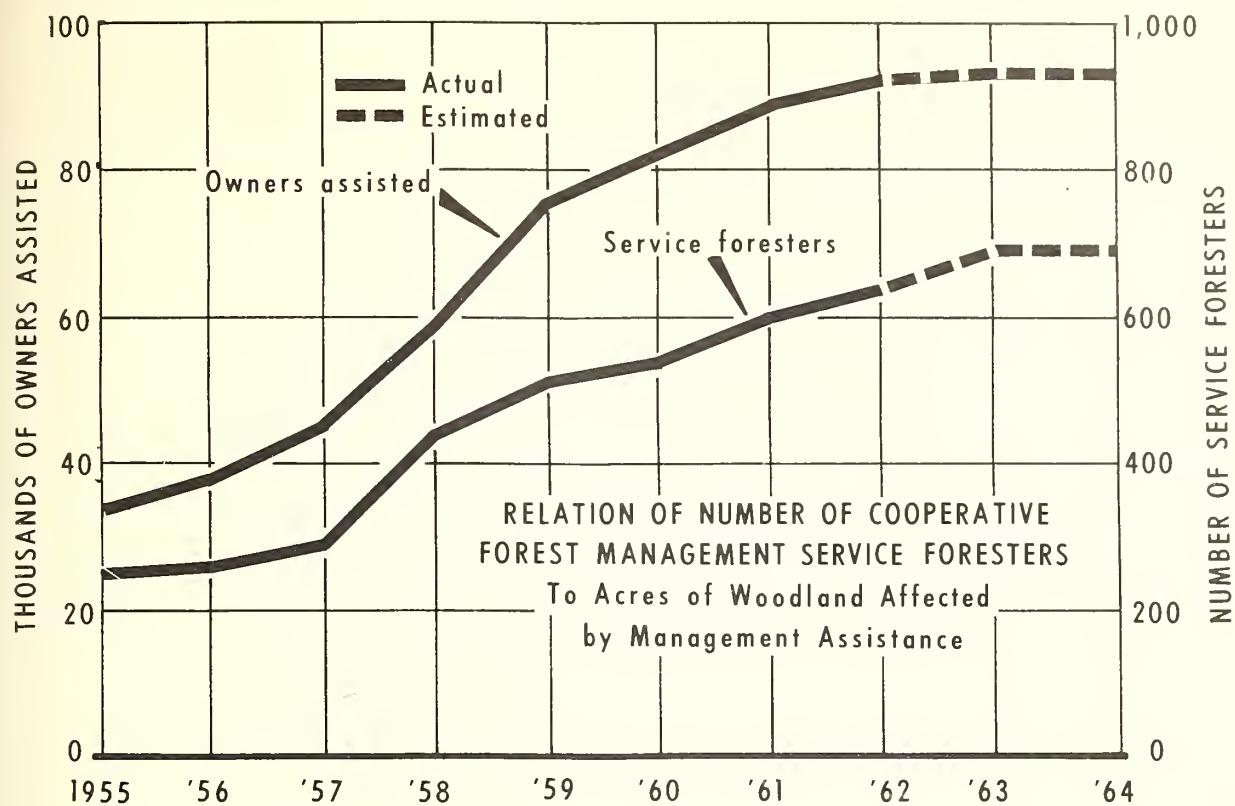


Figure T-6

Cooperative Forest Management



The service forester assists the landowner in planning for the multiple use management of his lands to wisely develop and use the timber, wildlife, and recreation potentials.



A family plans and provides for a future forest crop.

Figure T-7

(31) General forestry assistance \$879,000

An increase of \$250,000 would be used to provide specialized technical forestry assistance in planning and activating programs involving the use of forest lands and the available industrial wood which will improve the economic and social well-being of communities and people largely dependent for employment and other financial benefits from the use and management of forest land and the processing of its products.

With the above increase, an additional 15 forest specialists would be employed largely to provide specialized technical services to State and local groups in support of the Department of Agriculture Rural Areas Development Program by giving assistance primarily to local committees and groups on timber inventory, markets for timber products, plant layout, economic aspects of timber industries, forest recreation possibilities, and other information concerning forests and products of forests. More than half of the States have large undeveloped rural areas. Most of these areas contain privately-owned woodland resources that are not contributing their share or potential to the economic welfare of the community. Profitable uses must be found for these land, water, and timber capabilities. Recreational opportunities hold great promise. Markets must be found for the quality of timber available, and the timber must be processed as far as possible within the area to create employment for local labor. These areas need much greater and rapid help in recognizing and developing opportunities for multiple use of these resource potentials.

The objective of this program is to provide specialized technical services not available through other programs or authorities to stimulate interest in and to help guide forest landowners, forest products processors, forest products marketing agencies, State and local planners, financing organizations and others in more adequately managing and utilizing the forest land resources for the benefit of the land resource, the landowners, the processors, the local labor resource and the local, State and National economies.

To accomplish this objective the Forest Service provides specialized technical assistance to State forestry organizations, universities, industrial and consulting foresters, private owners of large forest properties, other Federal forest property managers such as Atomic Energy Commission and military agencies, and to forest products processors. It also works with other Federal, State and local groups in servicing the Rural Areas Development Program. It performs the forest management work in the Virgin Islands formerly carried on by the Virgin Islands Corporation. Work is also performed in cooperation with defense agencies in connection with emergency supplies of timber and other forest products.

The proposed 1965 financing would make it possible to more effectively serve the Rural Areas Development groups and to stimulate improved forest management on 8 million acres of large private and industrial, State and local public and other Federal forest ownerships, and to assist forest products processors.

Examples of Recent Accomplishments

In fiscal year 1963 the work in General Forestry Assistance was intensified to provide technical help to State and local Rural Areas Development groups for planning and carrying out programs to make effective use of their forest

Project (31)

resources for improving rural income levels and employment opportunities. Over half of the 800 low-income counties designated in accordance with the Area Re-development Act are more than 50% forested (Figure T-8).

At the same time specialized technical assistance in forest management and timber processing and marketing, not available through other programs, continued to be given to State forestry organizations, universities, industrial and consulting foresters, private owners of large forest properties, other Federal forest property managers, military agencies, and to forest products processors. Work was performed in cooperation with defense agencies in planning for emergency supplies of timber and other forest products.

In the Virgin Islands, forestry work formerly financed under appropriations to the Virgin Islands Corporation was continued under the General Forestry Assistance program.

General Forestry Assistance



The timber industry is the "heart" of the local economy of many rural areas.



The harvesting of timber provides raw material for timber based industries and employment for local residents.



New markets are sought to facilitate efficient utilization of local forest products.

Figure T-8

(32) Increased pay costs (P.L. 87-793) \$2,338,000

An increase of \$2,338,000 for pay costs pursuant to P.L. 87-793 for fiscal year 1965 costs of the additional increase effective January 5, 1964. The 1964 appropriation includes costs related to the second step of the pay increase for approximately one-half year. In order to continue all programs financed from this appropriation at the 1964 program levels, the additional salary cost impact for a full year must be provided. Failure to provide for this additional cost would seriously curtail these programs as it would not be possible to accomplish the full amount of work planned under these budget estimates.

Forest land management	\$1,829,000
Forest research	471,000
State and private forestry cooperation	38,000
Total	<u>2,338,000</u>

In evaluating the importance of providing for this increase, it must be recognized that major pay cost absorptions are being made in other programs which are directly related to the Forest land management subappropriation activities. The total estimated 1965 cost absorption impacts are:

Expenses, Brush Disposal	\$390,000
Cooperative Work, Forest Service (Sale area betterment)	785,000
Working Capital Fund	475,000
Total absorptions	<u>1,650,000</u>

FINANCING OF DEVELOPMENT PROGRAM FOR THE NATIONAL FORESTS, CUMULATIVE FISCAL YEARS 1963-1964
 (Including Pay Act Costs, P.L. 87-793)
 (In thousands of dollars)

	1963-1964	1963-1964	Available			
	Planned	Planned	Public	Differ-	Percent	
	Level	Approp.	Works	Total	ence	Financed
<u>National Forest Protection and Management:</u>						
Timber resource management:						
Sales administration and management	52,492	52,513		52,513	21	100.0
Reforestation and stand improvement	44,572	31,091	7,000	38,091	-6,481	85.5
Subtotal, Timber resource management	97,064	83,604	7,000	90,604	-6,460	93.3
Recreation-public use	74,637	51,389	10,500	61,889	-12,748	82.9
Wildlife habitat management	8,438	7,067	1,700	8,767	329	103.9
Range resource management:						
Management	10,136	9,864		9,864	-272	97.3
Revegetation	5,615	5,400	100	5,500	-115	98.0
Improvements	7,305	6,470	2,300	8,770	1,465	120.0
Subtotal, Range resource management	23,056	21,734	2,400	24,134	1,078	104.7
Soil and water management	14,583	10,919	1,300	12,219	-2,364	83.7
Mineral claims, leases, and special uses	8,064	7,369		7,369	-695	91.4
Land classification, adjustments, and surveys	9,473	7,557		7,557	-1,916	80.0
Forest fire protection	49,129	44,816	1,600	46,416	-2,713	94.5
Structural improvements for fire and general purposes	27,705	22,804	13,000	35,804	8,099	129.2
Total, National Forest Protection and Management	312,149	257,259	37,500	294,759	-17,390	94.4
<u>Insect and Disease Control:</u>						
White pine blister rust control	7,463	7,057		7,057	-406	94.6
Other pest control	13,510	17,266	300	17,566	4,056	130.0
Total, Insect and Disease Control 1/	20,973	24,323	300	24,623	3,650	117.4
Purchase of Lands (Weeks and Special Acts)	7,445	3,812		3,812	-3,633	51.2
Forest Roads and Trails (Including all related appropriations)	174,868	137,400	18,800	156,200	-18,668	89.3
TOTAL	515,435	422,794	56,600	479,394	-36,041	93.0

1/ Includes \$4,500,000 for lands not administered by the Forest Service.

(b) Forest Roads and Trails

Appropriation Act, 1964 and base for 1965	\$63,200,000
Budget Estimate, 1965	72,300,000
Increase	<u>+9,100,000</u>

This appropriation provides for the liquidation of obligations incurred for the construction and maintenance of forest roads and trails (and the purchase of access roads) pursuant to the authorization contained in the Federal Highway Act of 1962. An appropriation of \$72,300,000 for 1965 will provide sufficient cash to liquidate prior year obligations and obligations planned for fiscal year 1965 which must be paid by June 30, 1965.

Analysis of Cash Requirements by Activities a/

	<u>Actual 1963</u>	<u>Estimated 1964</u>	<u>Estimated 1965</u>	<u>Increase or Decrease</u>
Construction of roads and trails ..	\$29,140,194	\$60,848,606	\$60,700,000	-\$148,606
Maintenance of roads and trails ..	10,250,000	11,500,000	11,600,000	+100,000
Total	39,390,194	72,348,606	72,300,000	-\$48,606

Authorizations for Appropriations a/

<u>Fiscal Year</u>	<u>Construction</u>	<u>Maintenance</u>	<u>Total</u>	<u>Funded</u>	<u>Unfunded</u>
1963	\$41,000,000	\$9,000,000	\$50,000,000	\$50,000,000	~ ~
1964	58,000,000	12,000,000	70,000,000	b/47,036,000	c/\$22,964,000
1965	72,900,000	12,100,000	85,000,000	72,300,000	d/ 12,700,000
Total	171,900,000	33,100,000	205,000,000	169,336,000	e/ 35,664,000

a/ The annual appropriation language and these Explanatory Notes combine the appropriation for Forest Roads and Trails made pursuant to 23 U.S.C. 205 and the appropriation of 10% of forest receipts for construction and maintenance of roads and trails pursuant to 16 U.S.C. 501. This merger of funds is made in order to simplify the programming, allotment, and accounting of funds at the field level. Since the accounts for these two funds are merged, it is not practicable to distribute obligations and expenditures between the two appropriations on a precise basis. The amounts shown for the Forest Roads and Trails appropriation are a proration based on the percentage that contract authorization used under the appropriated funds is of total available funds. Expenditure amounts for maintenance are based on all such obligations requiring cash payment during the fiscal year.

b/ The 1964 appropriation of \$63,200,000 less prior year unfunded authorization of \$16,164,000 provides \$47,036,000 for funding of the \$70,000,000 authorization for 1964.

c/ Includes \$5,000,000 of the 1964 authorization which will not be obligated in 1964.

d/ Includes \$12,500,000 of the 1965 authorization which will not be obligated in 1965.

e/ Net unfunded obligations is \$18,164,000.

Status of Unfunded Authorizations

Unfunded contract authorizations beginning of 1964	\$86,164,000
Appropriation, 1964	-63,200,000
New contract authorization, 1964 (1965 authorization available in 1964--Federal Highway Act of 1962, approved October 23, 1962)	85,000,000
1964 administrative cancellation of obligating authority	-5,000,000
1965 administrative cancellation of obligating authority	-12,500,000
Total unfunded beginning of 1965	90,464,000
1965 Budget Estimate (cash requirements)	-72,300,000
Balance to remain unfunded as of June 30, 1965	a/18,164,000

a/ Total unfunded under Highway Act authorities, including the cancellation, is estimated to be \$35,664,000.

Analysis of Cash Requirements

1. Unliquidated obligations, June 30, 1963	\$24,851,209
2. Estimated cash requirements to finance 1964 program	a/47,497,397
3. Total cash requirements by June 30, 1964	<u>72,348,606</u>
4. Less cash on hand 1964:	
Balance from 1963	\$9,148,606
Appropriated 1964	<u>63,200,000</u>
5. Cash balance from 1964 available for use in 1965	<u>72,348,606</u>
6. Obligations in 1964 for which cash was not provided in	
item 2	17,964,000
7. Estimated cash required to finance 1965 program	b/54,336,000
8. Total cash required for 1965	<u>72,300,000</u>

a/ An estimated 73% of the \$65,461,396 of new obligations will require cash payments during the fiscal year.

b/ An estimated 75% of \$72,500,000 of new obligations will require cash payments during the fiscal year.

The following tabulation reflects the total program for the construction and maintenance of roads and trails on the National Forests for combining the funds available under the appropriation Forest Roads and Trails with the permanent appropriation of 10% of National Forest receipts. This permanent appropriation for Roads and Trails for States (10% fund) is estimated at \$12,400,000 for 1965 compared with \$12,000,882 for 1964, an increase of \$399,118.

PROJECT STATEMENT

Project	1963	1964	Increases and Decreases			1965
			Increased		Other	
			Pay Costs	(P.L. 87-793)	(estimated)	
1. Construction of roads and trails ..	\$47,823,235	\$63,462,278	+\$345,000	+\$6,907,722	\$70,715,000	
2. Maintenance of roads and trails ..	12,777,409	14,000,000	+185,000	- -	14,185,000	
Total obligations ..	60,600,644	77,462,278	+530,000	+6,907,722	84,900,000	
Transfer from "Roads and Trails for States"	-10,900,118	-12,000,882	- -	-399,118	-12,400,000	
Program under "Forest Roads and Trails" contract authorization	49,700,526	65,461,396	+530,000	+6,508,604	72,500,000	
Change in unfunded obligations	-5,200,526	-2,261,396	- -	+2,061,396	-200,000	
Subtotal	44,500,000	63,200,000	+530,000	+8,570,000	72,300,000	
Total increased pay costs on second step of pay increase: (P.L. 87-793)	(- -)	(488,000)	(+530,000)	(+60,000)	(1,078,000)	
Total available or estimate	44,500,000	63,200,000	+530,000	+8,570,000	72,300,000	

An increase of \$9,100,000 (\$8,570,000 program and \$530,000 pay cost) is needed to meet cash requirements for liquidation of contract authorization. This appropriation provides for the liquidation of obligations incurred for the construction and maintenance of forest roads and trails pursuant to the authorization contained in the Federal Highway Act of 1962. An appropriation of \$72,300,000 for 1965 is required to:

- (a) Pay for obligations of the prior year which will be due for payment in fiscal year 1965, and
- (b) Pay the portion of 1965 obligations of \$72,500,000 contract authorization which will require cash payment in that year.

The presence or lack of access by road or trail has a direct and controlling influence on all aspects of forest management, protection, utilization, and development. An adequate system of forest development roads and trails must be installed and maintained to facilitate the maximum practicable yield and use of all forest resources on a sound sustained-yield basis.

The road and trail needs are estimated on the basis of requirements for access in the year 2000 for major needs such as the protection of watersheds producing 200 million acre feet of water annually, recreation and wildlife use by 635 million visitors a year, an annual timber cut of 21 billion board feet, and grazing use on 60 million acres of rangeland. It is estimated that this

will require the construction of 380,000 miles of new roads, 6,000 miles of trails, and the reconstruction of 105,000 miles of existing roads and 10,500 miles of existing trails.

During the period 1963-1972, 46,400 miles of multi-purpose roads and 8,000 miles of trails should be constructed by the Forest Service at a total cost of \$1.3 billion. At the 1964 construction level of \$63.5 million, it would take over 20 years to provide the transportation system that should be in place by 1972.

The Federal Highway Act of 1962 provides forest development road and trail authorizations of \$70 million for 1964 and \$85 million for 1965. The 1964 appropriation provides for utilization of only \$65 million of the \$70 million authority with \$5 million subject to administrative cancellation. The 1965 budget proposal contemplates use of \$72.5 million of the \$85 million authority with \$12.5 million subject to administrative cancellation.

Pay act costs for fiscal years 1963 and 1964 have been absorbed within the available obligating authorities:

1963	\$862,000
1964	\$1,800,000

The total cumulative pay act costs for fiscal year 1965 are estimated to be \$2,330,000 of which \$1,800,000 was previously absorbed in the 1964 appropriation. Cumulatively, for the period 1963-1965, a total of \$4,462,000 of such costs will have been absorbed.

The \$530,000 shown for 1965 represents the cost of the additional increase effective January 5, 1964, pursuant to PL 87-793, that must be absorbed within the obligating authority authorized for use. The 1964 appropriation included the costs related to the second step of the pay increase for approximately one-half year. In order to continue all programs financed from this appropriation at the 1964 program levels, the additional salary cost impact for the full year must be provided.

Following is a summary of the road program proposed for 1965:

	<u>Units</u>	<u>Estimated Cost</u>
<u>Construction and Reconstruction</u>		
Bridges	280	\$5,000,000
Roads	1,900 miles	38,915,000
Trails	687 miles	2,000,000
Surveys, plans, and supervision for timber purchaser roads	4,900 miles	19,300,000
Federal cost for timber purchaser construction	1,200 miles	4,500,000
Road purchase		1,000,000
Subtotal construction and reconstruction		<u>70,715,000</u>
<u>Maintenance</u>		<u>14,185,000</u>
<u>Total</u>		<u>84,900,000</u>

Examples of Recent Accomplishments

Under this program, the existing system of roads and trails used for the protection and multiple use management of the National Forests is maintained and improved and additional facilities are constructed as needed to develop the forests and obtain the maximum practicable yield and use of their resources on a continuing basis. An adequate and complete system of roads and trails is essential. (See Figure U-1.) During the 10-year period 1963-1972, 46,400 miles of roads and 8,000 miles of trails should be built by the Forest Service to meet forest management, protection, development, and utilization needs. During fiscal years 1963 and 1964, approximately 12% of this construction should have been completed. Even with the estimated 1,300 miles of road construction derived from Accelerated Public Works financing, construction during 1963-1964 will be about 85% of that planned and, in view of the geographic distribution associated with the Public Works Acceleration, progress may be as much as 50% behind schedule in some areas.

In October 1962 and February 1963, areas in California, Oregon, and Washington sustained some of the most extensive storm damage of record. Ten to thirty inches of rain were recorded in a 72-96 hour period at some locations. Fourteen National Forests in California reported storm damage to roads and trails at approximately \$2.5 million. Some repair was accomplished in fiscal year 1963 by reprogramming from construction to maintenance but it was necessary to divert approximately \$2 million of fiscal year 1964 construction funds to reconstruct and repair these damaged roads. Over \$300,000 of construction funds were also used for storm damage repair in Oregon and Washington during fiscal year 1963. (See Figure U-2.)

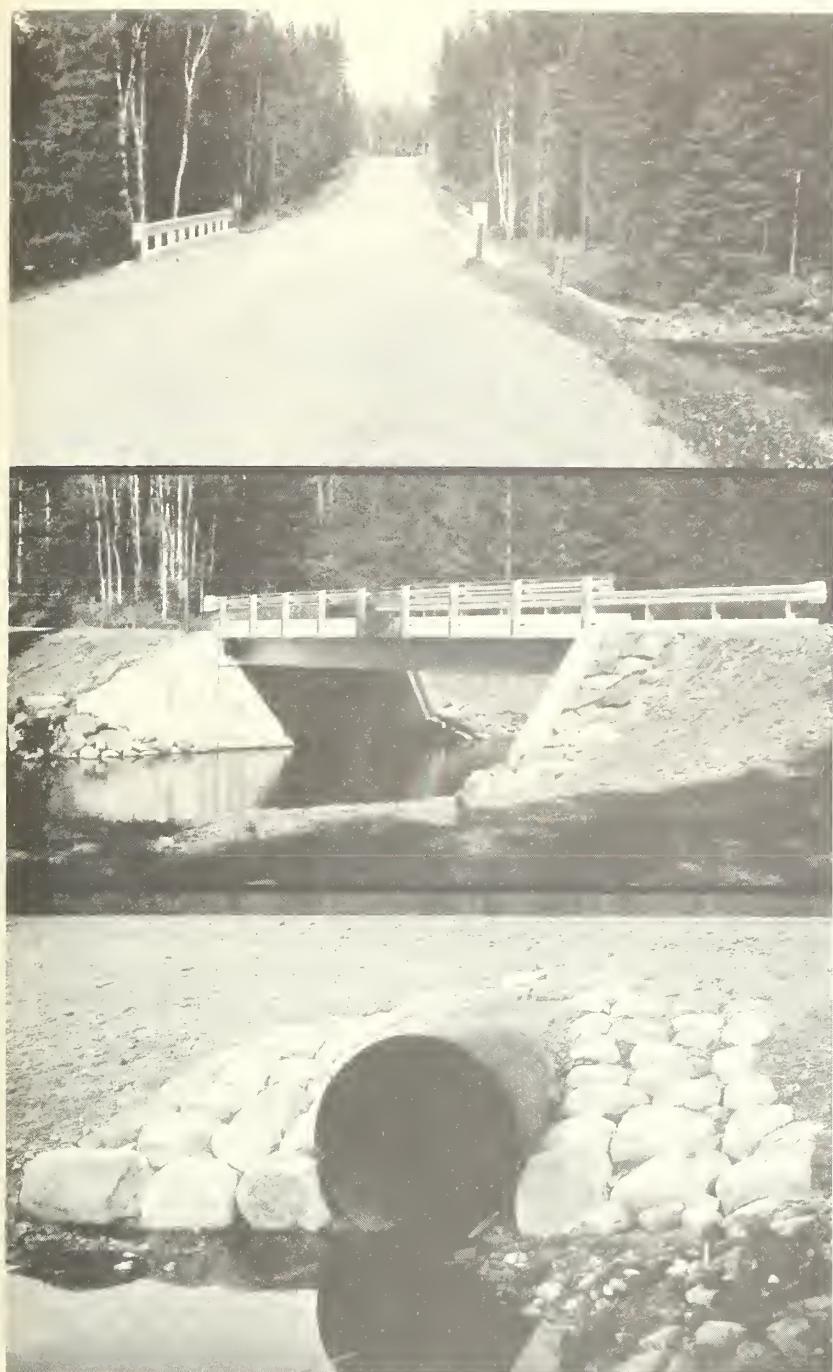
The transportation system is maintained in part by the Federal government and in part by State and local road authorities, private cooperators, licensees, permittees, and purchasers of Federal timber and other forest products. The following tabulation shows how the system was maintained in fiscal year 1963:

	<u>Roads</u> (approximate mileage)	<u>Trails</u>
By the Government	106,086	102,360
By Others	79,981	3,266
Total	186,067	105,626

During fiscal year 1963, \$12,778 thousand was obligated for maintenance and preservation of existing roads and trails and \$47,823 thousand for road, trail, and bridge construction and reconstruction. In addition, purchasers of Federal timber accomplished road maintenance representing an estimated expenditure of \$5,526,000 and started construction on roads estimated to cost \$54,478,000.

Construction started in fiscal year 1963 was:

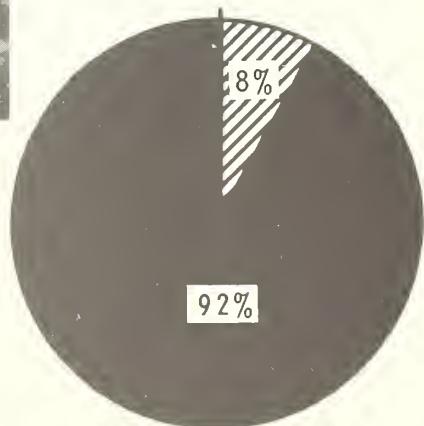
<u>By the Government</u>	<u>By Purchasers of Federal Timber</u>	<u>By APW Funds</u>
Roads (miles)	1,151	4,790
Trails (miles)	335	--
Bridges (number) ...	259	53



Forest Roads and Trails

Properly designed and constructed roads are essential to National Forest management, protection, development, and resource utilization.

10 YEAR ROAD CONSTRUCTION NEEDS
46,400 Miles



- Estimated completion 1963-1964
- Yet to be done

Figure U-1

Storm Damage



Washed out culvert.



Gully--60 ft. deep, 150 ft. wide.



Road covered with debris.



Road surfacing washed away.

During fiscal year 1962, forest roads in California, Oregon, and Washington were severely damaged by unusually intensive rainfall. Immediate restoration was necessary for timber harvest and for the administration and protection of the National Forest lands.

Figure U-2

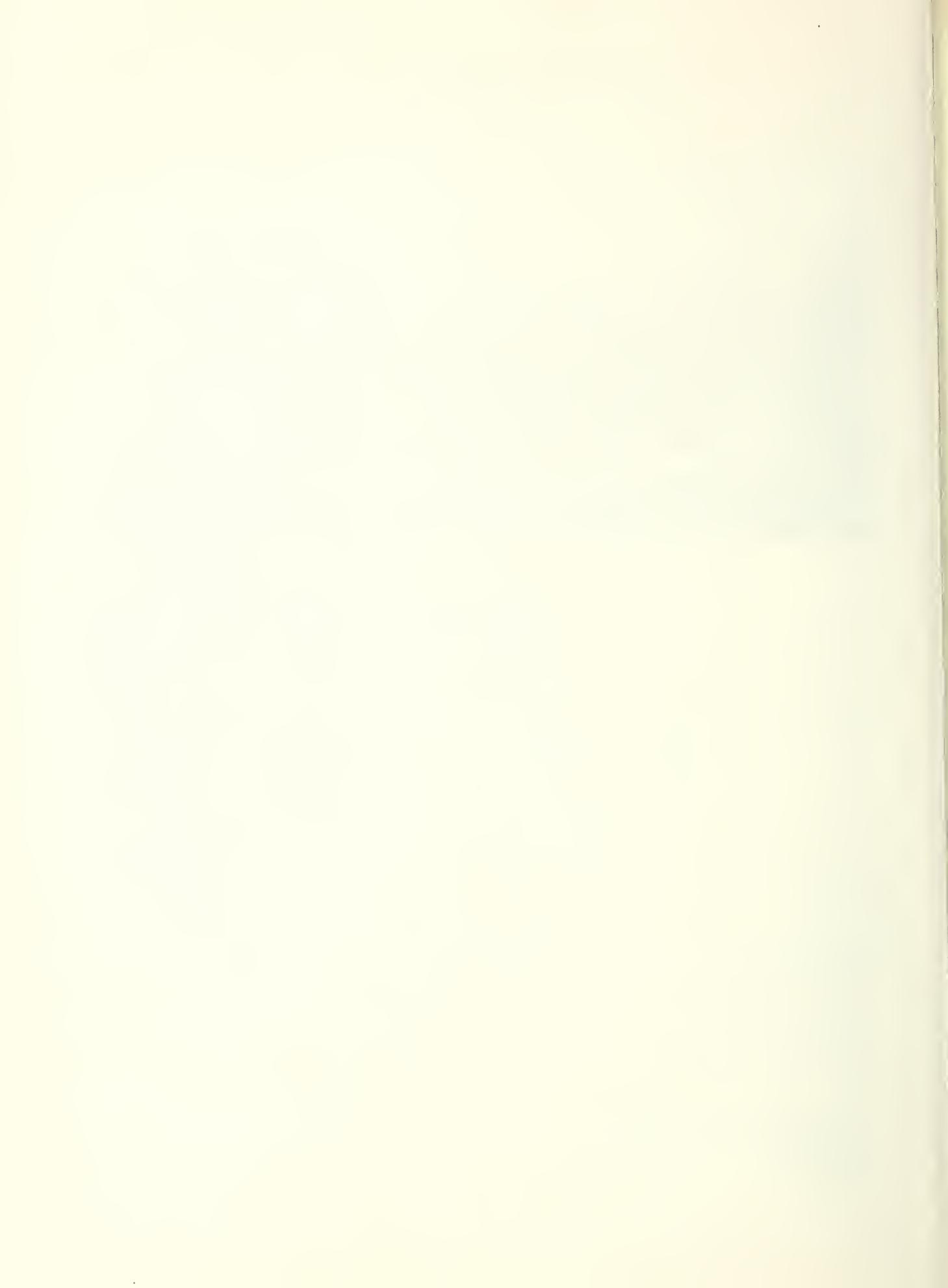
Signs in the Forest Service Program



To keep pace with development and use of the National Forests, 42,215 road and trail direction, regulatory, warning, and information signs were erected last year in addition to continuing maintenance on 400,000 signs in place. Approximately 500 of the larger-type entrance, headquarters, and information signs were erected to replace those deteriorated beyond repair. To meet public needs, 8,000 new and 2,000 replacement signs of this kind are needed.

The need for more complete and proper identification for the traveling public resulted in new designs for entrance, rural headquarters, and recreation site entrance signs in National Forests and National Grasslands.

Figure U-3



(c) Access Roads

PROJECT STATEMENT

Project	:	1963	:	1964 (estimated)	:	1965 (estimated)
Access roads	:	\$1,972,337	:	\$1,121,243	:	- -
Unobligated balances brought forward	:	-1,128,629	:	-1,121,243	:	- -
Unobligated balance carried forward	:	1,121,243	:	- -	:	- -
Unobligated balance lapsing	:	35,049	:	- -	:	- -
Total available or estimate	:	2,000,000	:	- -	:	- -

An unobligated balance of \$1,121,243 from the fiscal year 1962 appropriation will be fully obligated during fiscal year 1964. During fiscal year 1963, 750 cases were obtained involving 558 miles of new land easements or rights-of-way over existing roads or interests in existing roads. A total of 29 road rights-of-way condemnation cases were filed. An estimated 1,000 miles will be obtained in fiscal year 1964.

Effective with fiscal year 1964, this appropriation was eliminated and future access road purchase, beyond that to be accomplished with the balance remaining in this appropriation, will be accomplished under the Forest Roads and Trails appropriation.

(d) Acquisition of Lands for National Forests, Special Acts

Appropriation Act, 1964 and base for 1965	\$70,000
Budget Estimate, 1965	<u>70,000</u>

PROJECT STATEMENT

Project	1963	1964 (estimated)	1965 (estimated)
1. Cache National Forest, Utah	\$10,000	\$10,000	\$10,000
2. Uinta and Wasatch National Forests, Utah	9,569	20,000	20,000
3. Toiyabe National Forest, Nevada	--	8,000	8,000
4. Angeles National Forest, California	--	8,000	8,000
5. Cleveland National Forest, San Diego County (Calif.)	--	8,000	8,000
6. San Bernardino-Cleveland National Forests (River- side County), (Calif.) ..	--	8,000	8,000
7. Sequoia National Forest, California	--	8,000	8,000
Unobligated balance reverted to National Forests Fund	10,431	--	--
Total increased pay costs on second step of pay increase.. (P.L. 87-793)	--	(125)	(250)
Total available or estimate ...	30,000	70,000	70,000

The Congress has enacted several special laws which authorize appropriation from the receipts of certain specified National Forests for the purchase of lands to minimize erosion and flood damage. Appropriations under seven of these special acts for 1964 are:

Forest and Act

Cache (Utah), Act of May 11, 1938, as amended	\$10,000
Uinta-Wasatch (Utah), Act of August 26, 1935, as amended	20,000
Toiyabe (Nevada), Act of June 25, 1938, as amended	8,000
Angeles (California), Act of June 11, 1940	8,000
Cleveland, San Diego County (California), Act of June 11, 1940 ..	8,000
San Bernardino-Cleveland, Riverside County (California), Act of June 15, 1936, as amended	8,000
Sequoia (California), Act of June 17, 1940	8,000
Total	<u>70,000</u>

There are within each of the above National Forests, areas of critical watershed lands where the soil must be stabilized and vegetative cover restored if serious erosion and damaging floods are to be avoided. Necessary land treatment measures must be applied to all lands in the critical positions of these watersheds if corrective action is to be fully effective. To assure that this will be done, intermingled private ownership must be acquired by the Federal Government.

During fiscal year 1963 field examination was completed on 16,000 acres, and 1,262 acres of land were purchased under the special purchase authorities applying to the Cache, Uinta, and Wasatch National Forests in Utah. Figure V-1 shows a portion of one of the upper drainages in the American Fork Canyon Watershed, Uinta National Forest, in which such purchases are being made. It is typical of the type of country which if misused or improperly protected can funnel floodwaters into main channels with disastrous downstream effects.

Cache National Forest. In fiscal year 1963 funds were available from two sources for purchase of lands within the Cache National Forest in Utah.

1. The Receipts Act of May 11, 1938, as amended--\$10,000. This is an annual appropriation.
2. The Act of July 24, 1956--\$200,000 appropriated under this authority in fiscal years 1957 through 1960. These funds remain available until expended. Through fiscal year 1963 \$148,896 has been obligated from this appropriation.

These funds are used to acquire key tracts of lands in the steep, rough and highly important watershed areas lying north of the Ogden River, along the Wasatch front, and on the Wellesville Mountain of the Cache National Forest. These are tracts of land in the rugged mountain area above the river valley which through forest fires or over-grazing have been damaged and their watershed functions impaired. In this condition they contribute to excessive runoff of rainfall, are subject to erosion, and are potential sources of floods and mudrock flows. Many of them are located in the north fork of Ogden River and drain into the Pineview Reservoir, a Federal reclamation project. Others are within the watersheds of the City of Ogden and of the other small towns along the Wasatch front. Public ownership of these lands to restore and protect their vegetative cover is a highly important part of a vigorous cooperative program to protect and stabilize the watersheds of the local communities and the area draining into this expensive Federal project.

The 1956 Act requires that expenditures of Federal funds be matched by contributions by local agencies or people. This requirement has been met through donations of lands to the extent of some \$184,000. Additional contributions are expected in fiscal year 1964. The appropriation of \$10,000 under the Act of May 11, 1938 is from receipts of the Cache National Forest. In the absence of this appropriation, the local counties would receive 25% of these receipts for roads and school purposes.

Therefore, the local counties, in effect, are contributing one-fourth of the amount of this appropriation. These appropriations are extremely important to the continuation of a vital and worthwhile program extending over twenty years and shared in by both the local agencies and the Federal Government through the National Forests.

Through fiscal year 1963, 28,011 acres have been approved for purchase pursuant to the Receipts Act of 1938, and 14,120 acres under the Special Act of 1956. The 1964 objective is to acquire 2,300 additional acres of these critical watershed lands.

Uinta-Wasatch. In fiscal years 1963 and 1964 an appropriation of \$20,000 was made under the Uinta-Wasatch Receipts Act of August 26, 1935 for acquiring critical watershed lands in the American Fork Canyon watershed. Some 555 acres were approved for purchase in fiscal year 1963 and an estimated 700 acres will be acquired during 1964. It is estimated that it will take from four to five years to complete the necessary American Fork acquisitions.

Toiyabe, Angeles, Cleveland, San Bernardino, and Sequoia National Forests. In fiscal year 1964, \$8,000 was appropriated under each of these special acts to begin a program of acquiring critical watershed lands in these National Forests. It is estimated that approximately 700 acres will be purchased during 1964.

Acquisition of Lands, Special Acts



Watershed lands such as these in the headwaters of American Fork Canyon, Uinta National Forest, are presently subject to severe erosion losses.



Erosion damage must be arrested by immediate rehabilitation treatment which can only be accomplished under public land ownership.

Figure V-1

(e) Acquisition of Lands for Wasatch National Forest

Appropriation, 1964, and base for 1965	\$250,000
Budget Estimate, 1965	<u>150,000</u>
Decrease	<u>-100,000</u>

PROJECT STATEMENT

Project	1963	1964 (estimated)	Decrease	1965 (estimated)
Acquisition of lands for Wasatch National Forest (Total available or estimate)	- -	\$250,000	-\$100,000	\$150,000
Total increased pay costs on second step of pay increase (P.L. 87-793)	- -	(375)	(-375)	- -

(1) Public Law 87-661, approved September 14, 1962, added some 24,000 acres of land to the Wasatch National Forest in Utah, of which only approximately 5,000 acres in scattered tracts are now in Federal ownership. This Act authorizes the appropriation of \$400,000 for the purchase of privately-owned lands in this area. The fiscal year 1964 appropriation of \$250,000 leaves a balance of \$150,000 yet to be provided within this authorization.

Federal acquisition of these lands is imperative to aid in the control of floods and the reduction of soil erosion, and to permit management under principles of multiple use and sustained yield. The primary value of these lands is for watershed purposes. Presently most of the land is in a depleted condition from the standpoint of forage production and watershed capability. Sheet erosion is conspicuous on the steep upper slopes and drainages and the higher elevations are deeply gullied. On the bench lands the better forage and watershed plants have been largely replaced by annual plants of lesser value, and sheet erosion and gullying are beginning. These conditions, combined with the precipitous topography, pose threats of serious flood damage to properties below. Seven miles of the Gateway Canal are vulnerable to disrupting damage from excessive runoff or mudflows. This canal, a unit of the Weber Basin Reclamation Project, delivers vital supplies of water for distribution to heavily populated areas. Portions of the Union Pacific Railroad mainline and of Interstate Highway No. 40, as well as farmlands, also are vulnerable to damage originating on these lands. Public control of large contiguous areas comprising the watershed is essential in order that rehabilitation and land management measures may be undertaken to correct these unsatisfactory conditions. The \$150,000 requested would be used to complete the acquisition of key tracts in the area.

Approximately 15,000 acres of land will be purchased in 1964. Some 14,000 acres of this is in a single private ownership. The additional \$150,000 proposed for fiscal year 1965 will permit acquisition of the remaining key tracts of private lands within this area.

(f) Acquisition of Lands for Superior National Forest

PROJECT STATEMENT

Project	1963	1964 (estimated)	1965 (estimated)
Acquisition of lands for Superior National Forest	\$1,330,498	\$1,141,694	---
Unobligated balance brought forward	-472,192	-1,141,694	---
Unobligated balance carried forward	1,141,694	---	---
Total increased pay costs on second step of pay increase (P.L. 87-793)	- -	(600)	---
Total available or estimate	2,000,000	- -	---

The Act of June 22, 1948 (Public Law 80-733) as amended, provided authorization for the appropriation of \$4.5 million for the purchase of lands and improvements thereon in the Boundary Waters Canoe Area, Superior National Forest, Minnesota. The full amount of this authorization has been appropriated with the funds remaining available until expended.

The legislation authorized and directed the Secretary of Agriculture to acquire any properties which in his opinion should be in Federal ownership in order to restore and preserve the wilderness character of the remaining canoe country along the Canadian boundary in Minnesota. The available funds are sufficient to cover the cost of acquiring all of the remaining privately-owned properties in the area. Actions to vest title in the United States are in various stages of completion for approximately 11,000 acres of privately-owned lands, a large portion of which is unimproved property. Present plans are to complete this acquisition program by June 30, 1964.

(g) Acquisition of Lands for Cache National Forest

PROJECT STATEMENT

Project	: 1963	: 1964	: 1965
	: (estimated)	: (estimated)	
Acquisition of lands for Cache National Forest	\$54,793	\$51,105	--
Unobligated balance brought forward ...	-105,898	-51,105	--
Unobligated balance carried forward ...	51,105	--	--
Total available or estimate	--	--	--

The 1956 Appropriation Act provided \$200,000 for the acquisition of lands in the Cache National Forest pursuant to the Act of July 24, 1956 (70 Stat. 632). Obligations under this fund are in addition to the \$10,000 appropriation from National Forest receipts authorized by the Act of May 11, 1938 and provided in the appropriation, Acquisition of Lands for National Forests, Special Acts. Under the 1956 Act, funds appropriated must be matched by contribution of funds or land by local agencies or persons. Explanation of this program is included on page 117 under "Acquisition of Lands for National Forests, Special Acts".

(h) Cooperative Range Improvements

Appropriation Act, 1964 and base for 1965	\$700,000
Budget Estimate, 1965	<u>700,000</u>

Part of the grazing fees from the National Forests, when appropriated, are used to protect or improve the productivity of the range, mainly by construction and maintenance of fences, stock-watering facilities, bridges, corrals and driveways. These funds are advanced to and merged with the appropriation Forest protection and utilization, subappropriation Forest land management.

FORMULA FOR APPROPRIATION

Section 12 of the Act of April 24, 1950 (Granger-Thye Act) provides that of the moneys received from grazing fees by the Treasury from each National Forest during each fiscal year there shall be available at the end thereof when appropriated by Congress an amount equivalent to 2 cents per animal month for sheep and goats and 10 cents per animal month for other kinds of livestock under permit on such National Forest during the calendar year in which the fiscal year begins.

The appropriation for this item since fiscal year 1951 has been \$700,000, except for fiscal years 1954 and 1955 when \$531,000 and \$400,000 were appropriated. Since the actual use figures are not available until after more than one-half of the fiscal year for which funds are appropriated has elapsed, the 1965 appropriation request of \$700,000 necessarily represents the best current approximation of the amount which will become available in the calendar year 1964 under the animal-months-of-use formula.

For calendar year 1962, the latest available figures, use amounted to 5,491,911 animal months for cattle and horses; 6,283,040 animal months for sheep and goats; and 494 for swine. This use under the 2 cents and 10 cents formula calculated to \$674,901.

(i) Assistance to States for Tree Planting

Appropriation Act, 1964 and base for 1965		\$1,000,000
Budget Estimate, 1965		<u>1,000,000</u>

PROJECT STATEMENT

Project	1963	1964	Increases and:	1965
	:(estimated)	decreases	:(estimated)	
Tree planting assistance ..	\$992,121	\$1,015,365	- -	\$1,000,000
Unobligated balance brought forward	-7,486	-15,365	- -	- -
Unobligated balance carried forward	15,365	- -	- -	- -
Total increased pay costs on second step of pay increase (P.L. 87-793) ..	--	(3,000)	(+3,000)	(6,000)
Total available or estimate	1,000,000	1,000,000	- -	1,000,000

This program's objective is to encourage and help finance the forestation of the 70 million acres of private and non-Federal public land. At the present rate of planting it will take over 70 years to complete this job. A substantial increase in the rate of forestation is required to help meet future national anticipated needs for industrial wood. It is also needed to provide additional employment in depressed rural areas and assist in the immediate and future economic development of these rural areas through more intensive multiple use and development of the forest land resource, and through the forest and other industries these lands can help support. The activities and industries to be stimulated and in part supported by the forestation work include forest-based timber industry, forest-based recreation industry, recreation and forest industry-based transportation and the supplying of services to these by individuals and organizations.

The States continue to show increased interest in reforestation under the authority of Title IV of the Agricultural Act of 1956. Thirty-three States now participate in the program. They have plans approved for forestation work on over 1,220,000 acres mostly in State and county ownerships. The total estimated cost is \$41,524,000.

This program is making valuable contribution to the future production of industrial wood. It affords the States an opportunity to accelerate their forestation work on unproductive areas. In addition to production of timber, there are benefits to soil conservation, watershed protection, wildlife habitat, and aesthetic and recreation values. It also is affording needed employment in many rural areas. Figure W-1 shows the progress that will have been made through fiscal year 1964 under this program.

THE REFORESTATION STORY, NON-FEDERAL LANDS UNDER
PROVISIONS OF TITLE IV OF THE AGRICULTURAL ACT OF 1956



The 10-year goal: 1, 500,000 acres

Reforested (through fiscal year 1963): 260,000 acres

No. of States participating.....	<u>1958</u>	<u>1962</u>	<u>1963</u>	<u>1964</u>
State funds	\$720,000	\$1,564,000	\$1,600,000	\$1,650,000 (est.)
Federal funds.....	\$500,000	\$1,000,000	\$1,000,000	\$1,000,000
Acres reforested.....	62,000	98,000	100,000	110,000 (est.)

Figure W-1

ADMINISTRATIVE PROVISIONS, FOREST SERVICE

CHANGES IN LANGUAGE

Changes in the language of this item are proposed as follows (new language underscored; deleted matter enclosed in brackets):

Appropriations available to the Forest Service for the current fiscal year shall be available for: (a) purchase of not to 1 exceed one hundred and thirty-six fifty-five passenger motor 2 vehicles of which one hundred and twenty-six fourteen shall be for replacement only, and hire of such vehicles; operation and maintenance of aircraft and the purchase of not to exceed 3 five of which three shall be six for replacement only; (b) employment pursuant to the second sentence of section 706(a) of the Organic Act of 1944 (5 U.S.C. 574), as amended by section 15 of the Act of August 2, 1946 (5 U.S.C. 55a), in an amount not to exceed \$25,000; (c) uniforms, or allowances therefor, as authorized by the Act of September 1, 1954, as amended (5 U.S.C. 2131); (d) purchase, erection, and alteration of buildings and other public improvements (5 U.S.C. 565a); (e) expenses of the National Forest Reservation Commission as authorized by section 14 of the Act of March 1, 1911 (16 U.S.C. 514); and (f) acquisition of land and interests therein for 4 sites for administrative purposes and acquisition of such outstanding interests in lands administered by the Forest Service in the northeast Georgia land utilization project⁷, pursuant to the Act of August 3, 1956 (7 U.S.C. 428a).

* * *

The first and second changes in language would provide authority for the Forest Service to purchase 155 passenger motor vehicles of which 114 will be replacements. The justification of this need appears in the following pages.

The third change in language would provide authority for the Forest Service to purchase six aircraft which will be replacements. It is also proposed to transfer four aircraft from other agencies as available. The justification of these needs appears in the following pages.

The fourth change deletes the special authorization for acquisition of outstanding interests in lands administered by the Forest Service in the State of Georgia. This will be accomplished during fiscal year 1964 so the authority need not be continued.

FOREST SERVICE

PASSENGER MOTOR VEHICLESPurchase of passenger motor vehicles

During fiscal year 1965 it is proposed to replace 114 passenger cars, 11 of which are station wagons, all of which will meet replacement standards. It is also proposed to purchase 41 additional passenger cars. In some instances, due to actual program needs, it may be necessary to substitute a sedan for a station wagon or vice versa at the time orders are placed which could make a minor change in the relative number of sedans and station wagons shown, but this would not change the total number of passenger motor vehicles scheduled for replacement and addition.

Based on the planned schedule of replacements and purchase of additions, the Forest Service would have a total of 687 passenger vehicles, excluding 4 busses, in fiscal year 1965. On analysis of vehicle use and age pattern, the fleet is expected to include 114 units which will meet or exceed replacement standards before replacements are received.

As of June 30, 1963, the age and mileage classes of the Forest Service net active fleet exclusive of 4 busses were:

<u>Age Data</u>		<u>Mileage Data</u>	
<u>Year Model</u>	<u>No. of vehicles</u>	<u>Lifetime mileage</u>	<u>No. of vehicles</u>
1958 or older	93	80,000 to 100,000	13
1959	61	60,000 to 80,000	99
1960	73	40,000 to 60,000	143
1961	97	20,000 to 40,000	139
1962	147	0 to 20,000	242
1963	165		Total 636
	Total 636		

Use of Vehicles

Passenger motor vehicles are used by (1) forest officers in the protection, utilization, management, and development of the National Forests and Land Utilization Projects and in the program for control of forest pests; (2) research technicians on experimental forests and ranges, on field research projects and forest surveys; (3) foresters engaged in carrying out the laws providing for State and private forestry cooperation; and (4) Regional Office field-going administrative personnel in performing, directing, and inspecting field work.

The Forest Service is essentially a field organization and its passenger motor vehicles are located mainly at Regional, National Forest, and Ranger District headquarters, and experimental forests and ranges. There are over 232 million acres within the exterior boundaries of the National Forests. About 435 million acres of State and private forest land are included within the areas which benefit from Federal participation in the cooperative forest program. Much of this area is without common carrier service, and most forest areas and research centers are remote from commercial travel routes, requiring extensive use of motor vehicles as a means of transportation. The major portion of transportation needs, particularly at forest Regional and Supervisor levels and at other larger headquarters

involves multiple passenger use and can be more expeditiously and economically met by use of sedans and station wagons than by other types of vehicles (Figure Z-1).

Justification of Replacements

Dependability of passenger vehicles is an important factor in keeping work programs on schedule and in meeting emergencies. Vehicle breakdowns while on field travel cause disruptions and delays in field work as well as loss of effective work time of employees. The continued use of over-age equipment is undesirable from a safety standpoint since most of it is operated over rough, narrow, winding roads in mountainous country under adverse conditions. This use generally results in excessive operating and repair expenses when vehicles reach or exceed replacement standards.

In order to maintain passenger cars in a safe and satisfactory operating condition, it is the policy of the Forest Service to schedule periodic preventive maintenance inspections, services, and tune-ups to reduce the necessity for costly repairs and major overhauls, and to minimize lost time resulting from field-breakdowns.

It is desirable to maintain a reasonable balance in the age class of the passenger vehicle inventory. The age class distribution is based upon conforming with replacement standards which recognize that some units will be retired under the age standard and others under the use standard. Prescribed replacement standards, although applicable, are not always appropriate for all Forest Service vehicles because of the wide range of operating conditions and the comparatively short field season in many of the National Forests at higher elevations. Decision on replacement of passenger vehicles which reach replacement age is based on an appraisal of each unit. This involves a review of the history record combined with a mechanical inspection of the vehicle's condition and repair liability. When such appraisal indicates that the vehicle is satisfactory for further service without unreasonable repair expenditures, it is retained and assigned to lighter work, even though such action tends to upset the age standards for the fleet inventory.

The vehicles selected for replacement are those which cannot be operated another season without excessive repair expense. They are unsatisfactory for further use both as to safety and mechanical condition. The replacement authorization requested is within the normal annual replacement standards prescribed by General Services Administration (i.e., a maximum of 60,000 miles or 6 years, whichever occurs first).

Essentially all passenger vehicles are pooled for use by all activities with replacement of pooled units financed from a Working Capital Fund. All appropriations reimburse this fund in ratio to use of vehicles on activities financed by the respective appropriations.

None of the replacements requested will be assigned to areas served or scheduled to be served by Inter-Agency Motor Pools.

Justification of Additional Vehicles

The Forest Service analyzes current work plans and programs in determining its overall passenger car requirements. This analysis includes a careful study of the number of vehicles needed at each field station, using as a guiding principle the ownership of only the minimum number of dependable units required to serve programs for which funds are budgeted. Also, it is Forest Service policy to utilize Inter-Agency Motor Pools or commercial car rental services to the fullest practicable extent. Passenger car use is restricted and is integrated with various activities so as to attain good utilization of all vehicles. Expanding activities in research, timber sales, public use of recreational facilities, fire protection, and other land management activities are increasing the need for more passenger cars. These increasing needs are being met in some areas through greater use of Inter-Agency Motor Pool vehicles. These pools, however, serve only very small parts of the total land area administered by the Forest Service; therefore, increasing requirements for passenger car transportation in several areas cannot be fully met except through purchase of additional units for the Forest Service fleet. None of the additions requested will be assigned to areas served or scheduled to be served by Inter-Agency Motor Pools.

Additions are financed from program funds in direct relationship to the anticipated use of the equipment. Distribution of costs to appropriations is based on analysis of use of the equipment fleet for the past three years and the estimated use for the budget year.



Forest Service activities require vehicles of many types. Suitable automotive equipment must be provided to enable management, protection, and development personnel to perform their work under all kinds of access and travel conditions.

Figure Z-1

AIRCRAFT

Replacement and Addition of Aircraft

The 1965 estimates propose replacement of six aircraft by purchase and four by transfer from other agencies as available. The Forest Service currently has 60 aircraft:

12 single-engine reconnaissance and transport airplanes
4 light twin-engine reconnaissance and transport airplanes
16 medium and heavy cargo and transport airplanes (10 medium, 6 heavy)
25 T-34B lead airplanes (2-place scout)
2 forest spray airplanes (Stearman and TBM)
1 helicopter

The single and light twin-engine reconnaissance and transport aircraft are used primarily to transport firefighters, smokejumpers, administrative personnel, equipment and supplies to remote and inaccessible areas where commercial service is inadequate, or not available for detection and suppression of forest fires. They are also used to locate and survey timber stand and vegetation conditions, such as insect infestations, blowdown, diseased areas, undesirable species, and to appraise resources and damage, and evaluate effectiveness of control.

The T-34B "lead" airplanes are used primarily by air tanker bosses to direct and control the dropping of fire retardants on forest fires by more than 200 tanker aircraft usually contracted from private owners.

The helicopter is used for training forest personnel in tactical use of helicopters and experimental development of techniques and equipment for direct tactical suppression of forest fires.

The six replacements requested will be single and light twin-engine airplanes. They will be utility airplanes that may be used for several purposes, such as lead planes for air tankers, small paracargo dropping, reconnaissance, and transporting freight and passengers. These will be new standard manufactured airplanes to upgrade old surplus T-34B's and single-engine reconnaissance airplanes which have reached an age in total number of flying hours where it is uneconomical to overhaul or modernize them to meet civil airworthiness requirements. These replacements will provide a more effective operation, with a wider safety margin. Forest Service aircraft are operated to a large extent over a rough, mountainous terrain where landing fields are poor and few. It is especially important that these aircraft be maintained for maximum performance and dependability to provide an adequate standard of safety.

Other aircraft currently in use may be replaced as newer and more suitable models and types become available from military services as excess property. They would be obtained on transfer without reimbursement and would not increase the fleet beyond 60 aircraft. When aircraft are partially or completely destroyed in a crash accident they may be replaced out of the appropriate available funds. The majority of current Forest Service aircraft was manufactured during World War II, and obtained from military surplus. Most of these planes have nearly reached their limit of useful age. The military services now have aircraft which have more potential suitability for Forest Service work that may become surplus in the near future. At present one medium and a large cargo and personnel transport have reached the limit of economical usefulness.



(j) Roads and Trails for States, National Forests Fund

Appropriation, 1964 and base for 1965	\$12,000,882
Budget Estimate, 1965	<u>12,400,000</u>
Increase (due to an estimated increase in National Forest receipts in fiscal year 1964)	<u>+399,118</u>

The permanent appropriation of 10% of National Forest receipts pursuant to the Act of March 4, 1913 (16 U.S.C. 501) is transferred to and merged with the annual appropriation for Forest Roads and Trails. The explanation of the use of these funds is included in the justification for that appropriation item.

The increase of \$399,118 results from an estimated increase in receipts from sale of timber for fiscal year 1964.

(k) Expenses, Brush Disposal

Appropriation, 1964 and base for 1965	\$9,000,000
Budget Estimate, 1965	<u>9,200,000</u>
Increase	<u>+200,000</u>

PROJECT STATEMENT

Project	: 1963	: 1964	: Increase or:	
			: (estimated)	: Decrease
Brush disposal	:\$7,695,991	:\$9,000,000	+\$200,000	\$9,200,000
Unobligated balance brought forward	:-6,569,022	:-7,630,984	--	-7,630,984
Unobligated balance carried forward	: 7,630,984	: 7,630,984	--	7,630,984
Total increased pay costs on second step of pay increase (P.L. 87-793) ..	: - -	: (80,000)	: (+100,000)	: (180,000)
Total available or estimate	: 8,757,953	: 9,000,000	: +200,000	: 9,200,000

The increase of \$200,000 reflects the additional work to be done as a result of the 11% increase in timber harvest which was 10 billion board feet during fiscal year 1963.

Timber cutting normally increases the fire hazard because of dry fuel increase in the form of logging slash. This slash may also contribute to the buildup of insect populations, increase certain disease infestations, and cause damage to stream channels.

National Forest timber sale contracts require treatment of debris from cutting operations or deposit of funds to pay for the work. When economical and expedient the work is performed by the timber purchaser. If it is not feasible for the purchaser to do the work, it is done by the Government using deposits made by the timber purchaser to cover costs of the work as authorized under Section 6 of the Act of April 24, 1960 (16 U.S.C. 490).

The effect of timber cutting and the manner of treating slash vary widely among Regions. In the three Eastern Regions, volume cut per acre is relatively low, utilization is high, and generally, humid atmospheric conditions result in rapid decomposition of debris so little slash

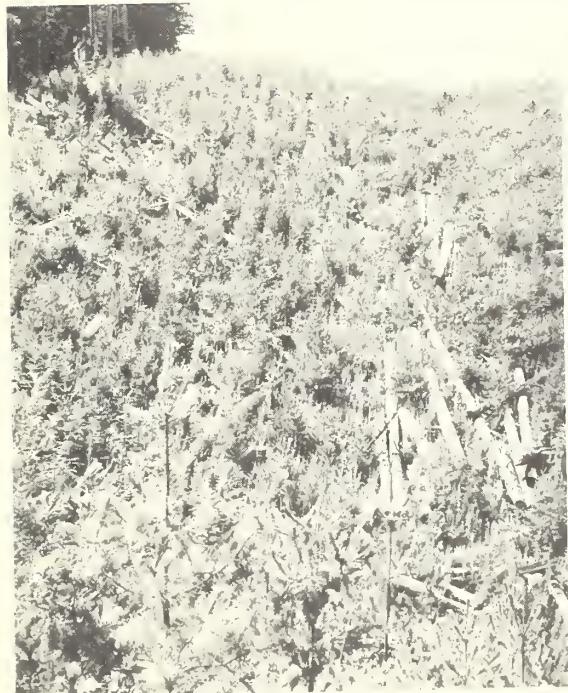
disposal work is necessary. An exception occurs in some sales where a heavier cut per acre is made, such as the jack pine stands of Minnesota. In such areas, slash is broken up and mixed with mineral soil by discing with heavy equipment. This reduces the hazard and provides a good seedbed to aid regeneration. Treatment of slash to prevent insect epidemics is sometimes necessary in these areas.

In contrast, the cost of slash abatement on most sale areas of the West is high. High volumes per acre generally produce heavy slash. Long dry periods with much lightning and man-caused fire risk result in extremely hazardous fire potential. The warm, humid condition necessary for rapid slash deterioration seldom occurs so more intense slash disposal is required. Treatment varies greatly with different methods of cutting. Clear-cut areas are broadcast burned. (See Figure X-1.) In selectively cut areas, debris may be piled for burning over the whole area or in strips which serve as fire-breaks.

While slash disposal follows general prescriptions within Regions, individual needs of each sale offering are planned and appraised prior to advertisement and appropriate specific requirements are incorporated into each timber sale contract. In each instance the method used is the one which will attain adequate protection of the area at the least expense. In some instances adequate protection from fire is attained by providing additional protection until the slash hazard reverts to near normal. Logging debris which may move into water courses under these conditions must be removed. Greater intensity of fire protection for several years and occasional stream clearance may be less costly than complete slash disposal immediately after cutting. In such cases Brush Disposal funds are used to provide the needed manpower and facilities.

Brush Disposal

On clear-cut areas logging slash is disposed of by burning. After the slash has been burned, the area is ready for natural regeneration or planting.



Several years later the young growth is firmly established and a future timber crop is assured.

Figure X-1

(1) Forest Fire Prevention

Appropriation, 1964 and base for 1965	\$45,000
Budget Estimate, 1965	25,000
Decrease	<u>-20,000</u>

PROJECT STATEMENT

Project	: 1963	: 1964	: Increase	: 1965
	: (estimated)	: (estimated)		: (estimated)
Forest fire prevention	\$12,543:	\$30,000:	- - :	\$30,000
Unobligated balance brought forward : -1,800:		-16,900:	-\$15,000:	-31,900
Unobligated balance carried forward : 16,900:		31,900:	-5,000:	26,900
Total available or estimate	<u>27,643:</u>	<u>45,000:</u>	<u>-20,000:</u>	<u>25,000</u>

The decrease of \$20,000 reflects the change in anticipated revenues for this year. The large increase in receipts in 1964 was due to a major sales program that was a one-time transaction. The actual obligations to be incurred in 1964 and 1965 will be at approximately the same level (\$30,000).

The Smokey Bear licensing program is an important part of the Cooperative Forest Fire Prevention Campaign which has been in effect for 22 years. The campaign itself has been conducted each year since 1942 as a cooperative project of the State Foresters and the Forest Service, United States Department of Agriculture, and is a public service program of the Advertising Council. The campaign utilizes the free public service resources of the various national advertising channels such as car cards, poster display systems, radio and television networks and magazine and newspaper allocation plans in developing public cooperation in the prevention of man-caused forest fires. Since 1945, this campaign has been built around Smokey Bear who has become recognized and accepted by the public as a nationwide symbol of forest fire prevention.

Under authorization of Public Law 359 of the 82nd Congress, the Secretary of Agriculture has issued rules and regulations governing the licensing program. These licenses specify payment of royalties (usually 5%) and set up certain controls for administering the program and collecting the royalties including advance deposits to protect the Government's interest. Such collections, along with appropriated funds, are used to finance the Cooperative Forest Fire Prevention Campaign.

The licensing program provides about one-tenth of the total funds required for the Cooperative Forest Fire Prevention Program.

The purpose of the project is public education on the need for the prevention of man-caused wildfires on all the Nation's forests and range-lands. Its goal is the further reduction of man-caused forest fires on all ownerships to the point where their impact on natural resource management programs is negligible.

This project is accomplishing its purpose in two ways:

1. By the dissemination to the public of Smokey Bear's forest fire prevention messages on commercial products licensed by the Chief of the Forest Service.
2. By support of the Smokey Bear Junior Forest Rangers and of the Smokey Bear Awards program through the contribution of fees and royalties by licensees.

Commercial support for the Smokey Bear Program is increasing. Receipts have risen about 35% in each of the past two fiscal years. Retail sales volume of Smokey Bear items for fiscal year 1963 is estimated at \$1,100,000, returning approximately \$27,600 to the program.

Examples of Recent Progress Accomplishments

1. Junior Forest Ranger appointments were processed for 175,000 young Americans.
2. Increased attention was given to recognition of outstanding public service in forest fire prevention with the approval of two Golden Smokey national awards and five Smokey Bear Plaque regional or State awards.
3. Severe drought conditions in several parts of the country last year increased fire hazard greatly. The fire record for 1962 reflects these severe conditions. This temporary reversal in trend has stimulated a resurgence of concern for and activity in forest fire prevention that will be a big factor in maintaining and improving our accomplishments in this field in the years ahead.
4. An operating plan was worked out with the Canadian Forestry Association which has strengthened our cooperative agreement with them, and has resulted in expansion of Canadian use of Smokey Bear fire prevention material. In view of increased tourist traffic between Canada and the United States, this increased use of common materials is strengthening the effectiveness of the program in both countries.
5. A mate for the live Smokey Bear was brought in and installed at the National Zoological Park in September 1962. As a result of heightened interest in this phase of the public information program, it was possible to use a contract with the District Government to secure detailed plans and specifications for a new Smokey Bear Home and Forest Fire Prevention Center to be built at the Zoo. The architects' fee of \$3,800 was taken from funds donated by thousands of youngsters all over the country for this purpose.



...and
PLEASE
make people
more careful!

(m) Restoration of Forest Lands and Improvements

Appropriation, 1964 and base for 1965	\$100,000
Budget Estimate, 1965	<u>100,000</u>

PROJECT STATEMENT

Project	: 1963	: 1964 :(estimated)	: Increase :(Decrease)	: 1965 :(estimated)
Restoration of forest lands and improvements	:\$6,849	:\$121,480	:\$-21,480	\$100,000
Unobligated balance brought forward	:-7,400	:-21,480	21,480	---
Unobligated balance carried forward	:21,480	---	---	---
Total increased pay costs on second step of pay increase (P.L.87-793)	:(- - -)	:(1,000)	:(+1,200)	(2,200)
Total available or estimate	:20,929	100,000	---	100,000

Recoveries from cash bonds or forfeitures under surety bonds by permittees or timber purchasers, who fail to complete performance, are used to complete improvement, protection, or rehabilitation work on lands under Forest Service administration. Funds received as settlement of a claim are used for improvement, protection, or rehabilitation made necessary by the action which led to the cash settlement (Act of June 20, 1958, 16 U.S.C. 579c).

(n) Payment to Minnesota (Cook, Lake, and St. Louis Counties)
from the National Forests Fund

Appropriation, 1964 and base for 1965	\$130,986
Budget Estimate, 1965	<u>133,000</u>
Increase	<u>+2,014</u>

PROJECT STATEMENT

Project	1963	1964 (estimated)	Increase	1965 (estimated)
Payment to Minnesota (total available or estimate) ..	\$125,432	\$130,986	+\$2,014	\$133,000

The Act of June 22, 1948, as amended (16 U.S.C. 577c-577h) provides that the Secretary of the Treasury, upon certification of the Secretary of Agriculture, shall pay to the State of Minnesota at the close of each fiscal year an amount equivalent to three-fourths of one percent of the fair appraised value of certain National Forest lands in the counties of Cook, Lake, and St. Louis situated within the Superior National Forest. The Act further provides that payment to the State shall be distributed to each of these counties in conformity with the fair appraised value of such National Forest lands in each county.

(o) Payments to Counties, National Grasslands

Appropriation, 1964 and base for 1965	\$437,500
Budget Estimate, 1965	<u>450,000</u>
Increase (due to an estimated increase in National Grasslands receipts for fiscal year 1964)	<u>+12,500</u>

PROJECT STATEMENT

Project	: 1963	: 1964 :(estimated):	: Increase	: 1965 :(estimated)
Payments to counties, National Grasslands (total available or estimate)	: \$389,506	: \$437,500	: +\$12,500	: \$450,000

At the end of each calendar year, 25% of the revenues from the use of sub-marginal lands are paid to counties under the provisions of Title III of the Bankhead-Jones Farm Tenant Act, approved July 22, 1937 (7 U.S.C. 1012).

(p) Payments to School Funds, Arizona and New Mexico,
Act of June 20, 1910

Appropriation, 1964 and base for 1965.....	\$110,413
Budget Estimate, 1965	<u>110,000</u>
Increase (due to an estimated increase in National Forest receipts for fiscal year 1964)	<u>+9,587</u>

PROJECT STATEMENT

Project	:	1963	:	1964	:	Increase	:	1965
	:		:	(estimated)	:		:	(estimated)
Payments to school funds	:	:	:	:	:	:	:	:
(total available or	:	:	:	:	:	:	:	:
estimate)	:	\$80,462	:	\$100,413	:	+\$9,587	:	\$110,000

Under provisions of the Act of June 20, 1910 (36 Stat. 562, 573) certain areas within National Forests were granted to the States for school purposes. The percentage that these lands are of the total National Forest area within the State is used in determining payments to the States. The receipts from all National Forest land within the State are used as the basis for applying the percentage. For example, if total receipts for the State are \$100,000 and if 10% of lands are in the "granted for school purposes" category, the payment to the State would be \$10,000. The amounts so paid are deducted from the net receipts before computing the 25% payments to States.

As soon after the close of the fiscal year as the receipts from National Forests and the area of school lands in the States of Arizona and New Mexico are determined, the payments are made to the States. Estimated payments in fiscal year 1964 to Arizona will be \$100,033 and to New Mexico \$380.

(q) Payments to States, National Forests Fund

Appropriation, 1964 and base for 1965	\$29,993,959
Budget Estimate, 1965	<u>31,100,000</u>
Increase (due to an estimated increase in National Forest receipts for fiscal year 1964)	<u>+\$1,106,041</u>

PROJECT STATEMENT

Project	:	1963	:	1964	:	Increase	:	1965
	:		:	(estimated)	:		:	(estimated)
Payments to States (total available or estimate)	:	\$27,235,140	:	\$29,993,959	:	+\$1,106,041	:	\$31,100,000

The Act of May 23, 1908, as amended (16 U.S.C. 500) requires, with a few exceptions, that 25% of all money received from the National Forests during any fiscal year be paid to the States in which the forests are located, for the benefit of public schools and public roads of the county or counties in which such National Forests are situated. The amount of this appropriation varies each year in direct proportion to National Forest receipts during the previous fiscal year.

The amounts set aside from receipts collected for the sale of National Forest timber, grazing and special use permits, etc., before the 25% is applied are listed below:

1. Payment to the State of Minnesota covering certain National Forest lands in the Counties of Cook, Lake, and St. Louis situated within the Superior National Forest is made under the terms of the Act of June 22, 1948, Public Law 733. Receipts collected from the areas covered by this Act are excluded when the 25% payment to the State of Minnesota is computed.
2. For lands in certain counties in Utah, Nevada, and California, the States receive 25% of receipts only after funds, if made available by Congress, have been set aside for the acquisition of National Forest lands within the specified National Forests under the terms of special acts authorizing appropriations from forest receipts for this purpose.
3. Payments to the States of Arizona and New Mexico under the provisions of the Act of June 20, 1910, of shares of the gross receipts from the National Forests in those States which are proportionate to the areas of land granted to the States for school purposes within the National Forests.





(r) Working Capital Fund, Forest Service

This fund finances on a reimbursable basis various services such as repairing and replacing equipment, including aircraft, stocking and issuing supplies, operation of subsistence camps, operation of photographic and reproduction facilities, and tree nurseries in support of programs of the Forest Service (16 U.S.C. 579b, as amended). These service operations serve programs of fire protection, timber utilization, construction and maintenance of roads and other improvements, reforestation, grazing, watershed, forest and forest products research, and kindred conservation activities of the Forest Service, including cooperative assistance with other Federal agencies, States, counties, and individuals engaged in the same objectives.

Operating results and financial condition. Government investment in the fund as of June 30, 1963, including donated assets and retained earnings for fiscal year 1963, is \$28,574 thousand. By the end of 1965 the investment is anticipated to be \$35,349 thousand, an increase of \$6,775 thousand which represents estimated earnings and donations during 1964 and 1965.

Receipts, non-operating income, and retained earnings include an estimated \$2,809 thousand as of June 30, 1965, identified as "Income provision for increased cost of equipment replacements" to be used only for financing the increased cost of equipment replacement, i.e., the difference between the cost of the replacement unit and the cost at time of acquisition of the unit being replaced. This increased cost is due to inflation and model improvement, and must be financed if the fleet strength is to be maintained and not depleted through the gradual attrition of price increases for replacements. The earnings for the provision for increased cost of replacements are derived from a factor which is included for this purpose in rental rates charged to program appropriations for equipment use and credited to the Working Capital Fund.

Retained earnings as of June 30, 1965, will total an estimated \$8,019 thousand which will consist of \$2,426 thousand gain on sale of equipment, \$2,784 thousand profit from operations, and \$2,809 thousand for provision for increased cost of replacement of equipment. Retained earnings have been applied toward increased cost of equipment replacements, purchase of fleet additions, and to furnish adequate working capital.





(s) Cooperative Work, Forest Service (Trust Fund)

Contributions are received from cooperators, including counties, States, timber sale operators, individuals, and associations, and are expended by the Forest Service in accordance with the terms of the applicable cooperative agreements. The work consists of protection and improvement of the National Forests, work performed for National Forest users, and forest investigations and protection, reforestation, and administration of private forest lands.

The major programs conducted under the account "Cooperative Work, Forest Service" are described below in terms of the projects reflected in the statement at the end of this section.

1. Construction and Maintenance of Road and Trails, and

2. Construction and Maintenance of Other Improvements:

Under the Acts of June 30, 1914 (16 U.S.C. 498) and March 3, 1925 and April 24, 1950 (16 U.S.C. 572) deposits for cooperative work are accepted from State and local government agencies, associations, Federal timber purchasers, and others for the construction and maintenance of roads, trails, and other improvements and for performing work which is the National Forest users' responsibility, this method of performance of the work being of mutual benefit or of benefit to the public at large. Cooperative deposits received for wildlife habitat improvement for States from their hunting and fishing fees are included in this activity.

3. Protection of National Forests and Adjacent Private Lands: The Act of June 30, 1914 (16 U.S.C. 498) authorizes the acceptance of deposits for the protection of the National Forests and the Act of March 3, 1925, as amended by Section 5, Act of April 24, 1950 (16 U.S.C. 572), authorizes the acceptance of contributions for the protection of private lands in or near the National Forests. The major portion of the obligations is for the protection of private lands from fire. This arrangement helps both parties since there are millions of acres of private forest land intermingled with Federal ownership on the National Forests. The lands in private ownership are usually in small tracts. It would be uneconomical for the owner to set up a fire control organization for the protection of his land. The advantage to the Government is that in many cases it would be necessary to suppress the fires on the private land without reimbursement in order to protect the adjoining Federal land.

4. Sale Area Betterment (including reforestation): Section 3 of the Act of June 9, 1930 (16 U.S.C. 576b) provides for deposits of funds by timber sale purchasers to cover the cost of reforestation and special cultural measures to improve the future stand of timber on the areas cutover by the purchaser. Deposits in fiscal year 1963 under this authorization totaled \$18.6 million. Fiscal year 1963

accomplishments under this program are reported under the Forest Land Management subappropriation along with accomplishments for reforestation and stand improvement for that subappropriation. (Figure Y-1)

5. Scaling: Under provisions of the Act of April 24, 1950 (16 U.S.C. 572) and of Section 210 of the Act of September 21, 1944 (16 U.S.C. 572a) acceptance of deposits from timber purchasers for cooperative scaling service is authorized. Such arrangements are established only when requested by the operator and when the operator pays the extra cost of such services.

Subsection (c), section 5, Act of April 24, 1950 (16 U.S.C. 572) provides broad authority to reimburse appropriations initially charged for expenses for cooperative services performed. The justification given in requesting this authority in the legislative history in House Report 1189 and Senate Report 1069, 81st Congress is limited to emergency situations. It would be convenient and economical to use this broad authority to furnish cooperative scaling services to timber purchasers by charging appropriations available for this type of work. Collections would be made later from the purchaser whenever he has arranged to pay for stumpage and other related charges after such charges have been determined. Comptroller General's Decision B-150466 dated January 14, 1963 clarified the authority in section 5 of the Act of April 24, 1950 (64 Stat. 82, 16 U.S.C. 572) to make collections in arrears for elective cooperative deposits related to timber sales applicable to payment bond procedures. In summary, the Comptroller General stated that he would have no legal obligations to the Forest Service rendering services authorized by section 5 on a reimbursable basis in instances where: (1) it has been administratively determined to be advantageous to the Government, and (2) necessary precautions have been taken to insure the recovery of all costs involved, including payment bond procedures; Provided: (1) deposits to appropriations do not exceed the amount of costs incurred, and (2) appropriate congressional committees be advised of our plans to use section 5c in situations other than the emergencies contemplated by the Congress at the time the law was enacted. Beginning in fiscal year 1964, the Forest Service plans to use this procedure when appropriate.

6. Research Investigations: The Acts of June 30, 1914 (16 U.S.C. 498) and May 22, 1928 (16 U.S.C. 581i-1) authorize the acceptance of deposits for forestry research. Deposits are received from State and other public agencies, and from industrial, association, and other private agencies to finance research projects of mutual interest and benefit to both parties. The deposits may be made either in a single sum or on a continuing basis, and may either partially or wholly cover the cost of the research. The cooperative research projects may involve any aspect of forestry and vary widely as to scope and duration. A very common example of such cooperation

is for a State to make a deposit to the cooperative work fund in order to intensify or to speed up completion of a comprehensive survey of the forest resources of the State. Other examples are State contributions toward forest fire research. The results of such cooperative investigations are made available to the general public as well as to the depositor.

7. Administration of Private Lands: The Act of March 3, 1925, as amended by Section 5, Act of April 24, 1950 (16 U.S.C. 572) authorizes the acceptance of contributions for the management of private lands. These contributions are made by private owners having land intermingled with or adjacent to National Forests who wish these lands managed in accordance with good forest management practices. Their holdings are usually too small to warrant the employment of professional foresters to administer such tracts. The advantages to the Government include the avoidance of possible high fire hazard areas resulting from improper cutting practices, the elimination of the necessity of precisely marking the boundaries of the private land, and additional private forest land handled under proper forest practices.
8. Reforestation (private lands): The Act of March 3, 1925, as amended by Section 5, Act of April 24, 1950 (16 U.S.C. 572) authorizes the acceptance of contributions for reforestation of private lands situated within or near a National Forest. This work is limited to areas of private land within a planting project on the National Forests or to areas in which certain civic and other public-spirited organizations have taken an interest.
9. Statement on Utilization of Funds: Following is a statement of funds received and obligated and balances available by major activities:

COOPERATIVE WORK, FOREST SERVICE
Trust Fund

Project	Balance Available June 30, 1962:		Actual Fiscal Year 1963		Estimate Fiscal Year 1964		Estimate Fiscal Year 1965	
	Funds Received	Obligations	Balance	Received	Obligations	Balance	Received	Obligations
1. Construction and maintenance of roads and trails	\$793,570	\$1,513,841	\$11,435,582	\$871,829	\$1,500,000	\$1,500,000	\$871,829	\$1,400,000
2. Construction and maintenance of other improvements	<u>a/</u> 383,842	552,851	413,796	522,897	550,000	550,000	522,897	450,000
3. Protection on National Forests and adjacent private land:								
(a) Fire	408,213	1,870,220	1,812,244	466,189	1,900,000	1,900,000	466,189	1,900,000
(b) Other	1,012,834	1,328,032	1,136,806	1,204,060	1,350,000	1,350,000	1,204,060	1,250,000
4. Sale area betterment on National Forest lands (including reforestation)	20,098,755	18,609,957	14,233,184	24,475,528	20,000,000	16,500,000	27,975,528	20,200,000
5. Scaling of timber	234,338	742,729	746,087	230,980	800,000	800,000	230,980	750,000
6. Research investigations	362,930	955,396	972,056	346,270	1,000,000	1,000,000	346,270	950,000
7. Administration of private lands	13,317	45,374	43,290	15,401	50,000	50,000	15,401	40,000
8. Reforestation (private lands)	100,724	17,784	26,369	92,139	25,000	30,000	87,139	20,000
Subtotal	23,408,523	25,636,184	20,819,414	28,225,293	27,175,000	23,680,000	31,720,293	26,910,000
Advanced to FOREST PROTECTION AND UTILIZATION FOR fighting forest fires	<u>b/</u>							
Total	23,408,523	25,636,184	22,219,414	26,825,293	27,175,000	22,280,000	31,720,293	26,910,000

a/ Includes approximately \$130,000 State hunting and fishing cooperative deposits.

b/ Reflects obligations in 1963 for fighting forest fires which were recovered from the 1964 appropriation for fighting forest fires.

c/ Includes \$1,175 reimbursed to appropriation.

c/ Includes \$1,175 reimbursed to appropriation.

(1) Transfers to National Forest Fund of earned sale area betterment deposits in excess of obligations for sale area betterment work \$252,753

(2) Refunds to cooperators 125,724
778,677

Above obligations for 1963 include:

Note: Balances carried forward are due primarily to necessity of deferring work for which funds are deposited until the most practicable time. For instance, funds for sale area betterment are received in advance of cutting, but work cannot be started until cutting operations are completed. The time lag sometimes extends for several years, depending on the amount of preparatory work required in the sale area, weather conditions, etc.

Timber Sale Area Reforestation



The newly logged area in the foreground is ready for slash disposal and reforestation treatment. The area in the top center was reforested 5 years earlier. The planting at the lower right is well established. The remaining blocks of timber are left for natural seeding and future harvest.



This area was burned over by a forest fire 35 years ago. The area to the right was replanted and now supports a good stand of young timber. The area to the left was not planted and has not made satisfactory recovery.

Figure Y-1



